Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J L Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : A		**Course Handling Faculty :** Dr. J L Mazher Iqbal			
1.	VTU21366	BITTU KUMAR	A	A	NE
2.	VTU21673	VANIPENTA CHANDRA REDDY	15	1	AB
3.	VTU22045	NANDIMANDALAM SAI SIVA	A	1	NE
4.	VTU22711	KORRAPATI MANIDEEP	8	12	D
5.	VTU23026	GURRAM VIJAY PRATYUSH REDDY	A	A	NE
6.	VTU23409	EDUBILLI APPALA NAIDU	4	A	NE
7.	VTU23566	POLIBOINA GURU MANOHAR	2	A	NE

Action Taken:

- Slip test was conducted.
- Extra coaching classes were conducted.

Improvements Observed:

- One students passed in test 2.
- Remaining students were very irregular to the classes.

Faculty

Course Coordinator

HoD

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School of Electrical and Communication

Department of Electronics and Communication Engineering

2023 - 2024 SUMMER SEMESTER

SLOW LEARNERS TIME TABLE

Course Code and Title : 10211EC101 – Circuit Theory

Course Coordinator : Dr.J L Mazher Iqbal

Course Handling Faculty : Dr.J L Mazher Iqbal

Section : A

Day/Hour	I 8:45 am - 09:35 am	II 09:45 am – 10:35 am	III 10:45 am – 11:35 am	IV 11:45 am – 12:35 pm	LUNCH	V 01:45 pm – 02:35 pm	VI 02:45 pm – 03:35 pm	VII 03:45 pm – 04:35 pm	VIII 04:45 pm - 05:35 pm
Monday									CT 'A' Sec
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									
Sunday									

Faculty Sign

Course Coordinator

HOD/ECE

Slow learners

CLASS: B.Tech SEM.: ODD COURSE: Circuit theory

	Roll No. VTU	Name	Aug		Sep				Oct	
		Date	21	28	4	11	18	25	9	16
		Hour	8	8	8	8	8	8	8	8
1	21366	Bittu Kumar	1	a	2	a	a	a	a	a
2	21673	V Chandra Reddy	a	1	a	a	a	a	a	2
3	22045	N Sai Siva	a	1	a	2	3	a	a	a
4	22711	K Manideep	a	1	2	a	a	a	3	4
5	23026	G Vijay pratyush Reddy	a	a	1	a	2	a	a	a
6	23409	E Appala Naidu	a	a	1	2	a	a	3	a
7	23566	P Guru Manohar	a	1	2	a	a	3	a	4
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Seminar

1	a
2	a
3	a
4	a
5	a
6	a
7	a
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	

friendly interface.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
WINTER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J L Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr. J L Mazher Iqbal		
1.	VTU21366	BITTU KUMAR	C	A
2.	VTU21673	VANIPENTA CHANDRA REDDY	C	12
3.	VTU22045	NANDIMANDALAM SAI SIVA	C	0
4.	VTU22711	KORRAPATI MANIDEEP	C	8
5.	VTU23026	GURRAM VIJAY PRATYUSH REDDY	C	1
6.	VTU23409	EDUBILLI APPALA NAIDU	C	3
7.	VTU23566	POLIBOINA GURU MANOHAR	C	2

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Irregular to the class.
- Lack of practice in circuit problem solving.
- Lack of time management.

Action Planned:

- Slip test will be conducted periodically.
- Special class will be conduct to coach on presenting answers.

Faculty **Course Coordinator** **HoD**

VTU 23026
Gr Vijay

The following equation give the current I_1 and I_2 at the two port of a two-port network.

$$I_1 = 0.25\,V_1 - 0.2\,V_2$$

$$I_2 = -0.2\,V_1 + 0.1\,V_2$$

Calculate the ABCD parameters for the network Hence write the network equation using the ABCD parameters.

V_1, V_2 are the Independent Variable. Hence the Contants gives the Y-parameters.

$$Y_{11} = 0.25 \text{ mho}$$

$$Y_{12} \neq Y_{21} = -0.2 \text{ mho}$$

$$Y_{22} = 0.1 \text{ mho}$$

$$A = -\frac{Y_{22}}{Y_{21}} = \frac{-0.1}{-0.2} = 0.5$$

$$B = \frac{-1}{Y_{21}} = \frac{-1}{-0.2} = 5\,\Omega$$

$$C = -\frac{\Delta Y}{Y_{21}} = -\frac{(Y_{11}Y_{22} - Y_{12}Y_{21})}{Y_{21}}$$

$$= -\frac{(0.25 \times 0.1 - 0.2 \times 0.2)}{-0.2}$$

$$= -0.075 \text{ mho}$$

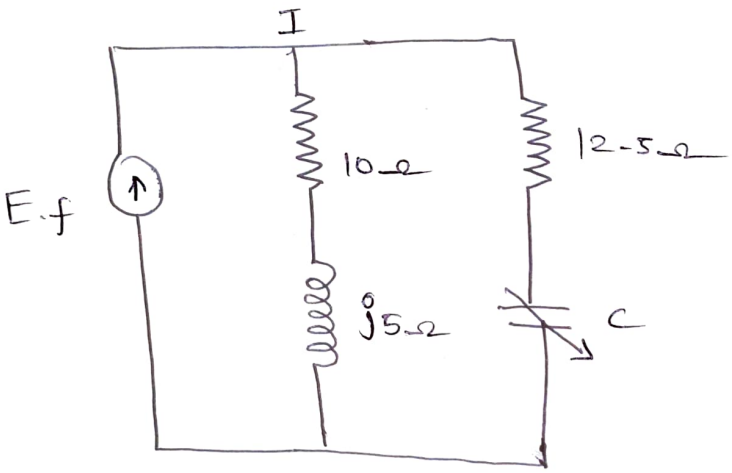
$$D = \frac{-Y_{11}}{Y_{21}} = \frac{-0.25}{-0.2} = 1.25$$

∴ The network equation are given by.

$$V_1 = AV_2 - BI_2 = 0.5V_2 - 5I_2$$

$$I_1 = CV_2 - DI_2 = -0.075V_2 - 1.25I_2$$

5. Determine the value of the capacitance C in order that the circuit in the figure is resonant at 6366 Hz.



$$Y = Y_1 + Y_2 = \frac{1}{Z_1} + \frac{1}{Z_2}$$

$$= \frac{1}{10+j5} + \frac{1}{12.5 - jX_C}$$

$$= \frac{10-j5}{125} + \frac{12.5 + jX_C}{156.25 + X_C^2}$$

$$= \left[0.08 + \frac{12.5}{156.25 + X_C^2}\right] + j\left[\frac{X_C}{156.25 + X_C^2} \cdot \frac{5}{125}\right]$$

At resonance, the reactive part of Y is equal to 0.

$$\frac{X_C}{156.25+X_C^2} = \frac{5}{125} = \frac{1}{25}$$

$$X_C^2 - 25X_C + 156.25 = 0$$

$$(X_C - 12.5)^2 = 0$$

$$X_C = 12.5\,\Omega$$

$$X_C = \frac{1}{2\pi f_0 C}$$

$$C = \frac{1}{(2\pi f_0) \times X_C}$$

Given that $f_0 = 6366$ Hz

$$\therefore C = \frac{1}{2\pi \times 6366 \times 12.5}$$

$$C = 2 \times 10^{-6}\,F$$

$$C = 2\,\mu F$$

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J.L.Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : B		Course Handling Faculty : Dr. S.SHIYAMALA		
1.	VTU23440	JUTURU JAYA RAKESH	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- Lagging of solving the problems.
- Absent for test

Action Planned:

- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test for slow learners.
- Motivate the student to attend the exam regularly

Faculty **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J.L.Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : B		**Course Handling Faculty :** Dr.S.SHIYAMALA			
1.	VTU23440	JUTURU JAYA RAKESH	0	AB	NE

Action Taken:

- Long Absent . Not able to conduct slip test

Improvements Observed:

- No improvement.

Faculty **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC102/ Analog Electronics

Course Coordinator : Dr. K. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : J		**Course Handling Faculty : Dr Ezhil E. Nithila**		
1.	VTU20820	S KRISHNA VAMSI	C	AB
2.	VTU21673	VANIPENTA CHANDRA REDDY	C	AB
3.	VTU23434	GONE RAVINDRA NAIDU	C	6
4.	VTU23461	BANKA GOPI	C	AB
5.	VTU23566	POLIBOINA GURU MANOHAR	C	0
6.	VTU23607	SHAIK FAREED BAIG	C	0
7.	VTU23676	GEDALA SHANKAR BHAGAVAN	C	1
8.	VTU23735	NARREDDY PULLA REDDY	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for low Performance:

Slow learner students are irregular to the class and most of them are late registration students.

Some students were absent for the exam.

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty Sign

Course Coordinator

HOD Sign

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : **10211EC102/ Analog Electronics**

Course Coordinator : **Dr. K. Harikrishna Paik**

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : J		Course Handling Faculty : Dr.Ezhil E.Nithila			
1.	VTU20820	S KRISHNA VAMSI	AB	AB	NE
2.	VTU21673	VANIPENTA CHANDRA REDDY	AB	19	D
3.	VTU23434	GONE RAVINDRA NAIDU	0.5	15	D
4.	VTU23461	BANKA GOPI	AB	AB	NE
5.	VTU23566	POLIBOINA GURU MANOHAR	AB	AB	NE
6.	VTU23607	SHAIK FAREED BAIG	AB	AB	RA
7.	VTU23676	GEDALA SHANKAR BHAGAVAN	AB	AB	RA
8.	VTU23735	NARREDDY PULLA REDDY	AB	AB	NE

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed:

Improvement was found among few students. Some students were absent for the exam.

Faculty

Course Coordinator

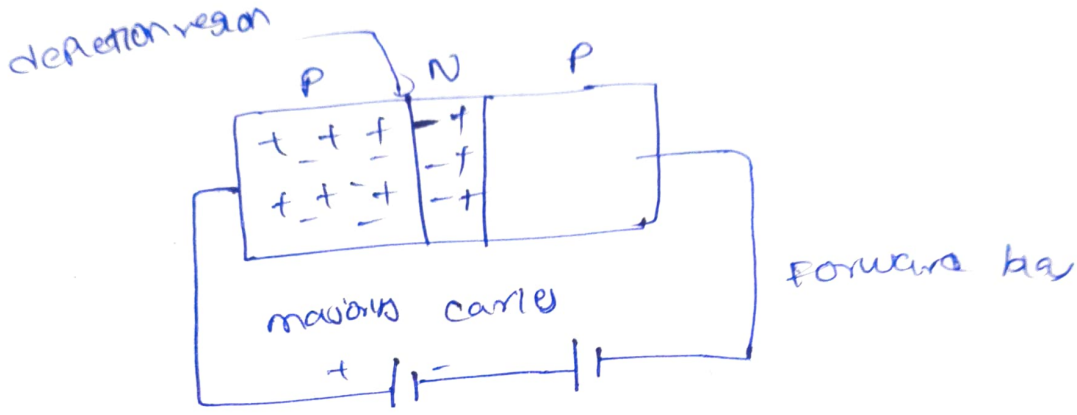
HOD Sign

Analog Electronics

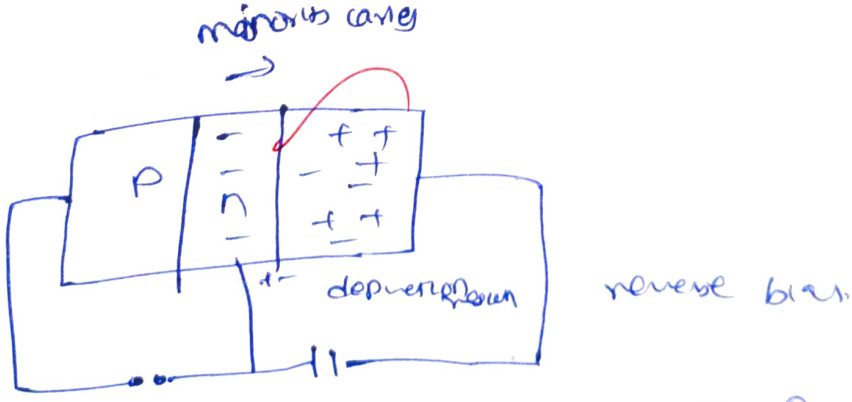
P. Chandrasekhar Reddy
VTU 21673

5

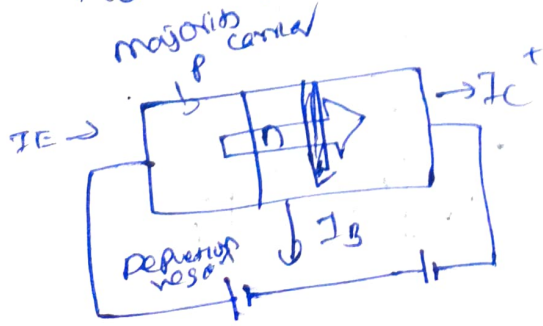
Transistor operation



The depletion region has been reduced in width due to the applied bias resulting in a heavy flow of majority carriers from the P to the n-type material.



The flow of majority carrier is 0.



A large number of majority flow of PNP carrier will diffuse across the transition. The magnitude of the base current is typically on the order of microamp as compared to milliamp for the emitter and collector current.

There has been an injection of minority carriers into the n-type base region material combining this with the fact that at the minority carriers in the depletion region.

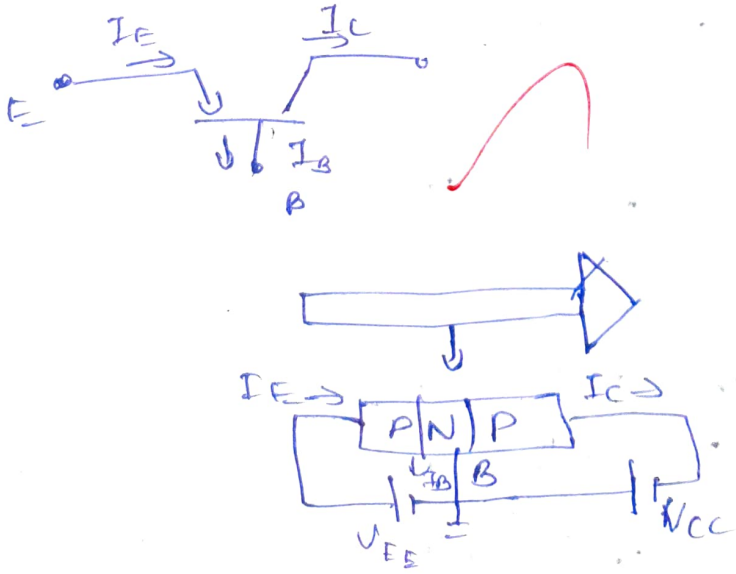
Apply KCL,

$$I_E = I_C + I_B$$

I_C = I_C majority + I_{CO} minority

I_{CO} = I_C current with emitter terminal open

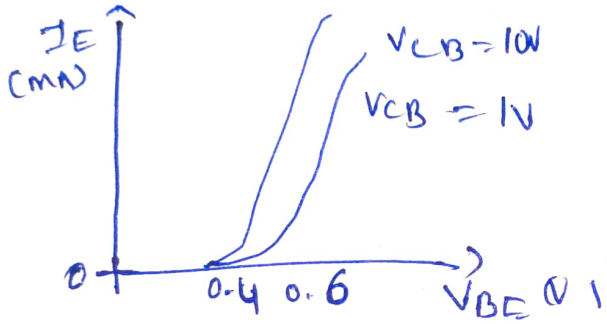
common base configuration



$$I_E = I_C + I_B$$

TWO Set of Characteristics

* one for driving point or I/P parameters
* others for the output side



I/P or driving pt chars

* Active
* cut off
* Saturation

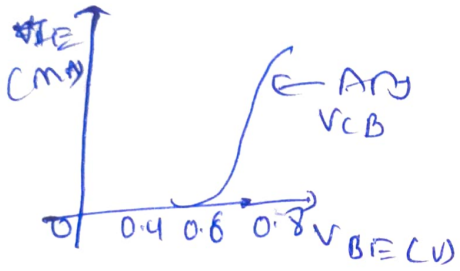
The relation b/w I_E and I_C is active region

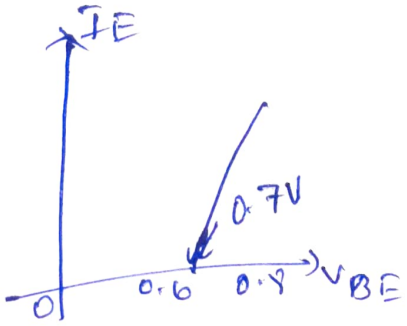
$$I_C \simeq I_E$$

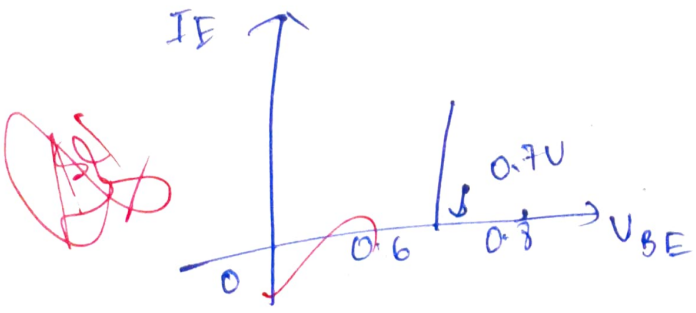
* For fixed value of V_{CB}, as the V_{BE} increases the I_E increases in a manner that closely resembles the diode characteristics. In fact increasing level of V_{CB} have such a small effect on the chars.

Once the transistor is in the 'ON' state the V_{BE} will be

$$V_{BE} = 0.7V$$







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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC102/ANALOG ELECTRONICS

Course Coordinator : DR HARIKRISHNA PAIK

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section :		**Course Handling Faculty :** DR HARIKRISHNA PAIK		
1.	VTU23791	CHALLA VINAY	C	8
2.	VTU23807	MEKALA MAHESH REDDY	C	4
3.	VTU21850	KUMBHAGIRI SIVA REDDY	C	10

Criteria for slow learners: Category 'C' & Failures in UNIT TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Ignorance and lack of practice
2. Irregular to class

Action Planned:

1. Verifying class notes regularly and attendance observation
2. discussing with them on topic discuss in last class and current class
3. Revision classes for these students and discussing important questions

Faculty Course Coordinator HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R: 21 B.TECH – ECE
Summer Term 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC101/ANALOG ELECTRONICS

Course Coordinator : DR HARIKRISHNA PAIK

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section :		**Course Handling Faculty :** DR HARIKRISHNA PAIK			
1.	VTU23791	CHALLA VINAY	13	11	Yet to declare (D)
2.	VTU23807	MEKALA MAHESH REDDY	4	6	Yet to declare (D)
3.	VTU21850	KUMBHAGIRI SIVA REDDY	20	20	Yet to declare (C)

Action Taken:

1. Revision classes for these students were taken and important questions were discussed for end semester exam

Improvements Observed:

1. Students scored well in TEST2 and TEST3
2. Prepared well for end sem exam

Faculty **Course Coordinator** **HOD Sign**

CLASS: 2/4 B.Tech SEM: SS23-24 COURSE: 102IECI02

Roll No. VTU	Name	Month	9	10	10	10	10
		Date	30	14	18	28	31
		Hour					
1 23791	Ch Vinay		1	2	A	3	4
2 23807	M Mahesh Reddy		1	A	A	2	3
3 21850	K Siva Reddy.		1	2	3	4	A
			0	1	1	0	1
			N	N	N	P	P

- Topic Covered -
Transistor - operation
Transistor - Biasing.
Oscillators
feed back amplifiers.

No. of Absentees

Analog Electronics

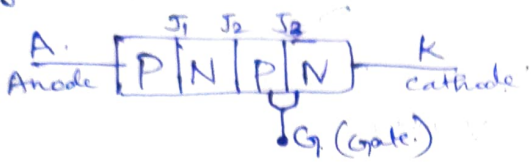
VTU25199

Date: 31/7/24

detail note on SCR:

* SCR → Semiconductor/silicon Controller Rectifier.

* SCR has four layers and three junctions with gate in the third junctions.

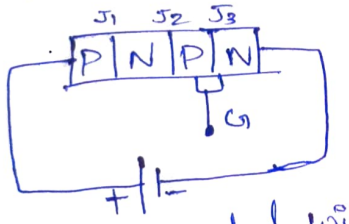


Symbol:



* SCR circuit will work with or without Gate connection.

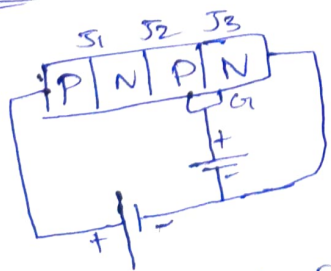
SCR without gate.



* When SCR is operated without gate in forward bias, the Junction 1 & Junction 3 will be forward bias while Junction 2 will be in Reverse bias.

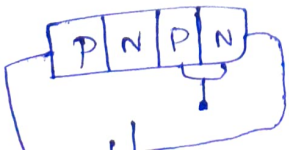
* At very high input voltage, all three junctions 1, 2, 3 will work and conducts current.

SCR with gate:



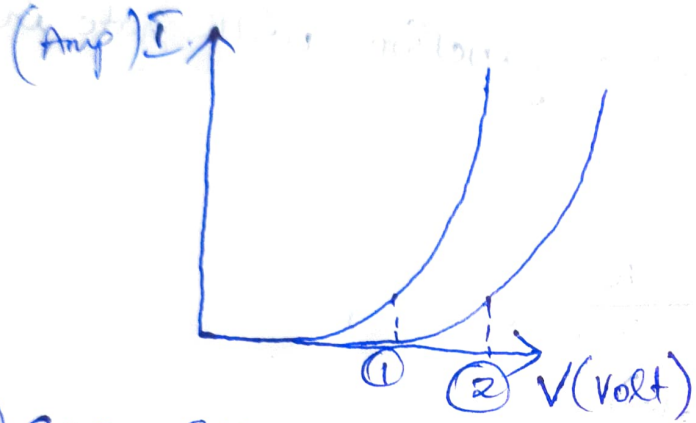
* When SCR with gate is connected in forward bias, the circuit will work even in minimum voltage input.

SCR in Reverse Bias condition:



* When SCR is connected in reverse bias, it half state condition.

V-I characteristics of SCR:



(1) SCR with gate
(2) SCR without gate.

Application:

* Motor controller.
* Rectifiers.
* Power controller.

SCR

It consists of four layer Junction Semiconductor device. It is used in as switch. It is widely used for the power controlling and Rectification.

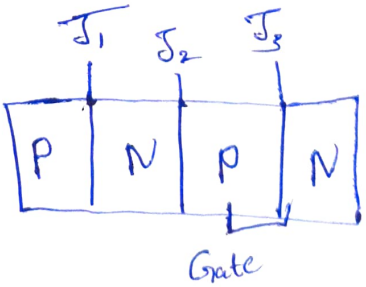
operation:

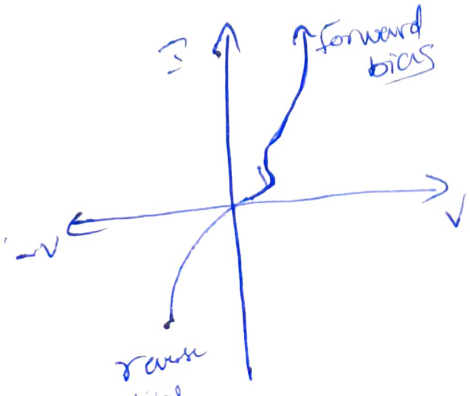
→ SCR without gate gives the applied input voltage Junction J_1, J_3 are in forward bias and J_2 remain in the Reverse bias. untill it remains in the SCR without gate It operates only very high I/P.

→ SCR enables gates the with in the forward bias and the gate opetes and device starts with Minimum Input voltage.

Applications

1. Motor control
2. Battery charging
3. light Dimmers
4. power invertors.





in detail.

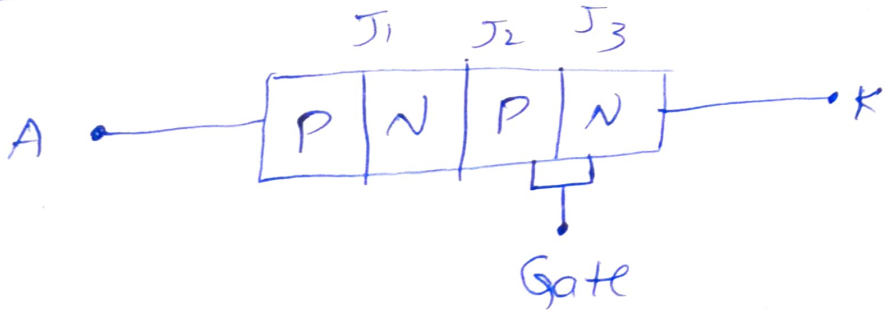
[B.Monisha]

SCR :- Silicon Controlled Rectification

SCR is referred as silicon controlled rectified.

* SCR is a four layered, three junction diode used as a switch.
* It is applicable in Power control and Motor inverters.
* The four layers in SCR is P, N, P, N.
* The three Junction in the SCR is Junction 1, Junction 2, Junction 3.

Symbol :-



SCR Operations :-

i) It is operated without Gate.

ii) It is operated with Gate.

i) SCR Without Gate:-

When SCR is without gate due to s
input voltage Junction 1 and Junction
is (reverse) forward biased and Junctio
is reverse bias untill some breat down
voltage is applied. It conducts only in
the forward bias. It conducts with very
high input voltage.

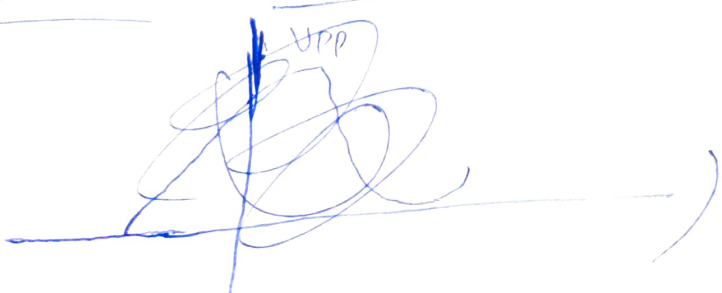
ii) SCR with Gate:-

When some external Dc voltage is
applied to the SCR, it conduct in
Forward bias. There is no reverse bias
flows in SCR with Gate. It conducts
with minimum input voltage.

Applications:-

i) Power invertars
ii) Motor control
iii) Light dimmers

(Chavacterstic Graph:-



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : H		**Course Handling Faculty :** Dr. Ajisha M		
1.	VTU22317	AMANJEET SINGH	C	02
2.	VTU23660	SHAIK HARRIS	C	03
3.	VTU23826	BELLAM KOTESWARA RAO	C	01

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Irregular to the class
2. Lack of preparation for solving problem
3. Lack of attention and focus in class

Action Planned:

- Planned to conduct Special classes.
- Planned to conduct slip test.
- Planned to give more practice on tutorial problems and derivations

Faculty Signature **Course Coordinator** **HOD/ECE**

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DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : H		**Course Handling Faculty :** Dr. Ajisha M			
1	VTU22317	AMANJEET SINGH	07	12	D
2	VTU23660	SHAIK HARRIS	AB	AB	NE
3	VTU23826	BELLAM KOTESWARA RAO	06	15	D

Action Taken:

1. Slip tests were conducted.
2. Text books and materials were shared
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were discussed.

Improvements Observed:

1. The Performance of few students were improved in T2 and T3 compared to T1
2. Students were able to present appropriate answers within the stipulated time.

Faculty Signature **Course Coordinator** **HOD/ECE**

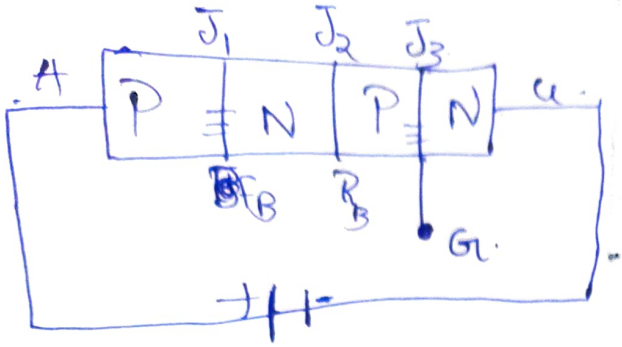
SLOW LEARNERS LIST

RECORD OF CLASS WORK

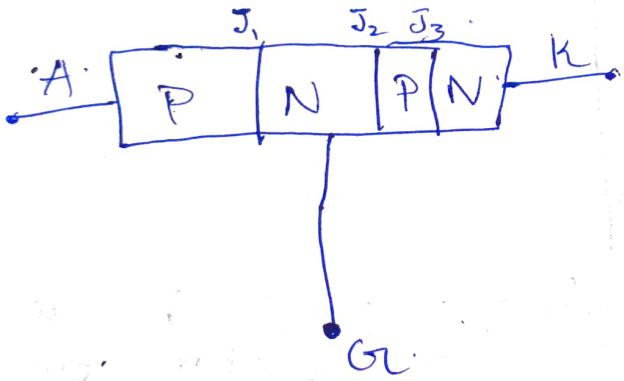
Class: Semester: Course:

S. No.	Date	Topics covered	No. of periods	Initials		
				Faculty	CC/MC	H.O.D
1.	04/09/23	Diode - Revision	1			
2.	20/09/23	Transistor - Revision	1			
3.	09/10/23	Hybrid π model	1			
4.	16/10/23	H - parameters	1			
5.	25/10/23	Oscillators - RC	1			
6.	26/10/23	Oscillators - LC	1			
7.	30/10/23	Power Amplifier	1			
8.	02/11/23	Feedback Amplifier	1			

SCR Semiconductor Controller retifier.



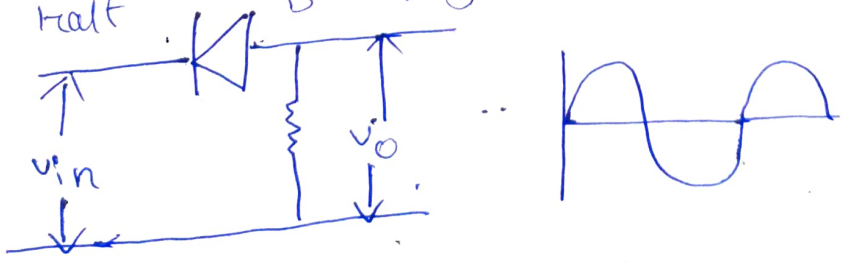
SCR is four layer crt it's acts like a switch.

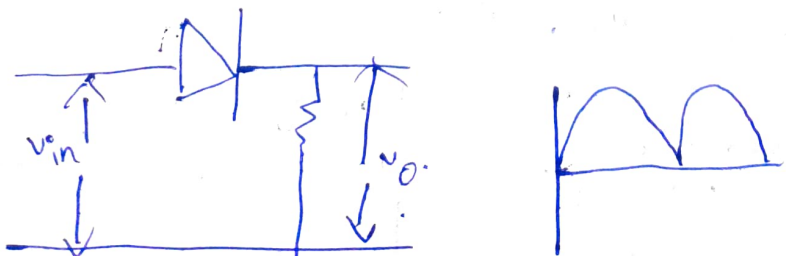


Operation :

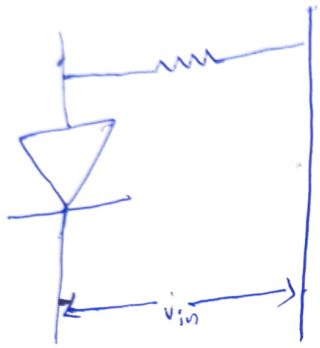
Forwad bias.

when SCR is four layer crt it's acts like a switch. one half of the P-type other half is n-type.









~~Application~~ working :- SCR is a full form is a semiconductor controller

→ ~~light~~ Inverse. is a four layer retifier. SCR

→ ~~motor~~ generator. acts like a crt in SCR. It's operations and switch. In SCR have circuits.

Applications :-

→ light Inverse.

→ motor - generator.

→ battery charging.

→ light Invators.

Name: C Abhiram Reddy

NTU: 24953.

Stands for Silicon controlled Rectification

1 P-n diode acts as a semiconductor devices that flows current in one direction and current flows in opposite direction

* A Pn diode acts as a semiconductor devices that allows current in one direction while converting current in another direction (or) opposite direction.

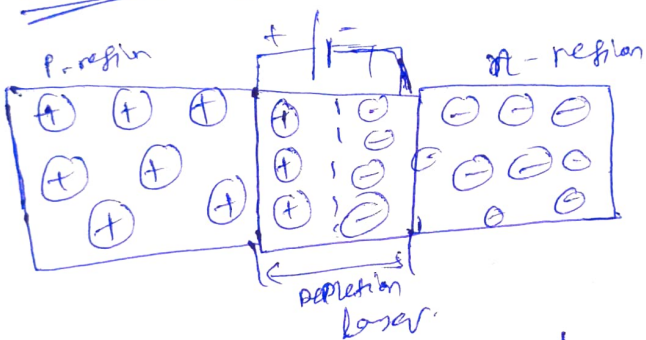
* It consists mainly two types

(1) Holes (rich in n-type region)

(2) electrons (rich in p-type region)

VTU25U47

Structure of pn-junction diode :-



→ The Pn-junction diode is formed by using p-type region and n-type region.

→ When trivalent impurities forms a pure type of semiconductor then it contains High number of electrons (p-type region)

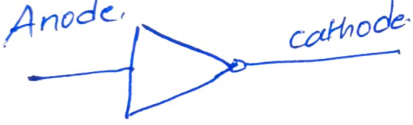
→ When pentavalent impurities forms a pure type of semiconductor then it contains High no. of holes (n-type region)

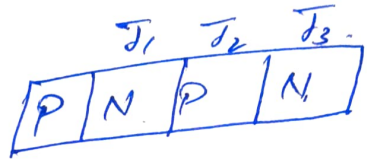
p-type region and n-type region forms a Depletion layer.

write about SCR (Silicon controlled Rectifier)

(A) silicon is a four Three terminal of semi-conductor device. as a switch. It is prevading of propogation of Amplification.

symbol





→ They have three types of terminal Anode. cathode, gate.
They are alternating of p-type and n-type.

operation:-
when SCR is semiconductor device in J_1 J_3 are the forward bias. J_2 are in the reverse bias. input voltage is high excepts of an rectification. In the off state J_1 J_3 are reverse bias and J_2 are reverse bias.

Applications

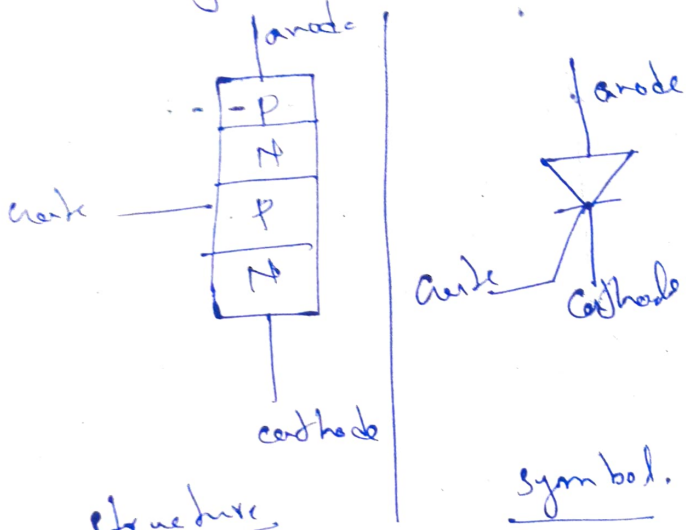
→ Battery charging
→ light devices.

Githanunjay

Silicon Controlled Rectifier (SCR) is four Layer and three junction device. It is used to be charge.

Structure and Symbol:

- The structure and symbol both are having similar gate, anode, cathode.
- The structure represents PN diode twice. It is donated by PNPN like structure.



Structure

Symbol.

- As they both are same but the structure and symbol are different.

Opperation:

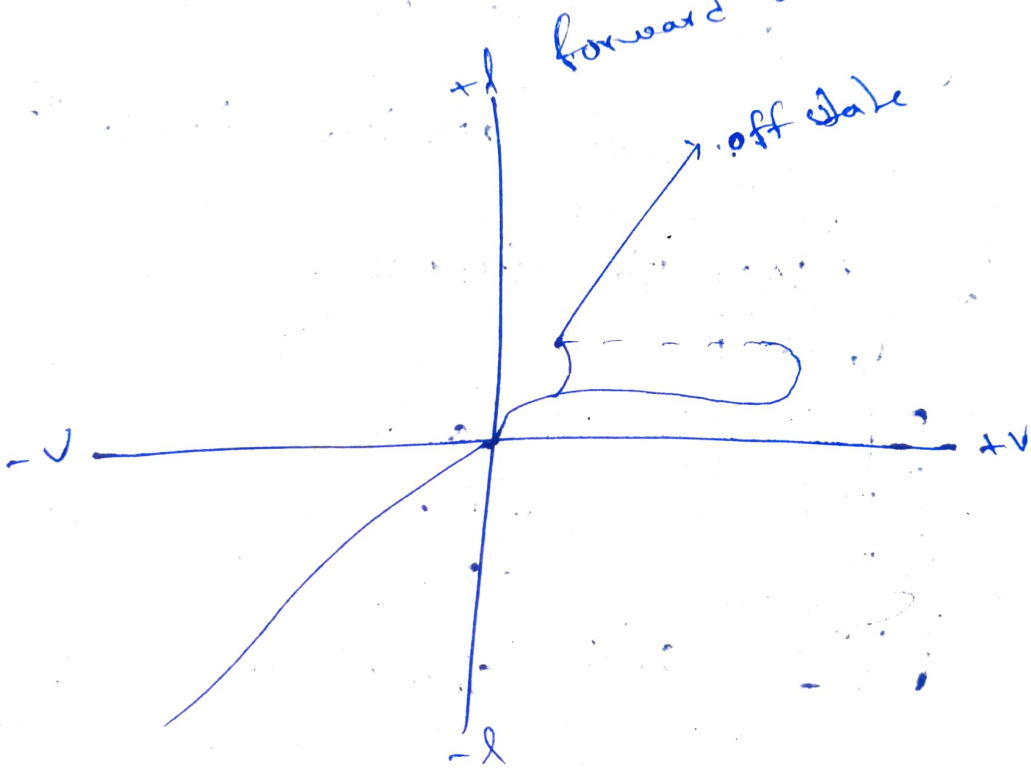
OFF State: when the anode supply the possitive charge. The anode enlarge itself and it is also known as offstate.

ON State: the cathode having negative charged, it also be on ON State only.

Application

- A/c o/c operation
- Battery charger
- Power Inverter charge.
- Light dimmer

Characteristics Graph :-



VTU 29428 Sohith

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC103/Digital Electronics

Course Coordinator : Dr. G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section :		Course Handling Faculty : Dr. J.Nirmal Jothi		
1	VTU22036	BHUMI REDDY RAMANATHA REDDY	C	0
2	VTU23807	MEKALA MAHESH REDDY	C	3.5

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Lack of attendance
2. Lack of preparation for the test.

Action Planned:

1. To conduct special class and Slip Test

Faculty **Course Coordinator** **HOD**

VTU 23428 nil.

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DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

69 les

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC103/Digital Electronics

Course Coordinator : Dr. G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : B		Course Handling Faculty : Dr. J.Nirmal Jothi			
1	VTU22036	BHUMI REDDY RAMANATHA REDDY	12	AB	NE
2	VTU23807	MEKALA MAHESH REDDY	7	12.5	D

Action Taken:

- Special class conducted. But the students were absent for the special class

Improvements Observed:

- Nil

Faculty

Course Coordinator

HOD

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : DIGITAL ELECTRONICS
Course Code: 10211EC103
Course Handling Faculty: Dr.J.Nirmal Jothi
Academic Year: 2023-2024
Course Coordinator : Dr. G.Sasikala
Semester : Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday	SL-DE								
Wednesday									
Thursday									
Friday									
Saturday									

SL-DE – Slow Learner's Class for Digital Electronics

Faculty **Course Coordinator** **HOD ECE**

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List of Slow Learners – Action Planned Report

Course Title : Digital Electronics
Course Code : 10211EC103 Academic Year :2023-24
Semester :Summer
Course Coordinator: Dr.G.Sasikala

S.No	VTU No.	Name of the Student	Performance in T- 1 CIA
Section: C		Course Handling Faculty :M.R.Ezilarasan	
1.	VTU21366	BITTU KUMAR	0
2.	VTU23240	SOMA SURENDRA BABU	AB
3.	VTU23595	ANANDHA KUMAR M	AB

Reason for Low Performance:

1. They are irregular to the class.
2. Late registration
3. Lack of preparation by students.
4. Students felt difficulties in Problem solving

Action Planned:

1. Will explain more problems for their better Understanding.
2. To give assignments and homework on problems
3. Slip test Will be conducted

Course Coordinator

HOD Sign

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List of Slow Learners – Action Taken Report

Date after T II :06.11.2023

Course Title : Digital Electronics

Course Code : 10211EC103 Academic Year :2023-24

Semester :Summer semester

Course Coordinator: Dr.G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			T2	T3
Section : C		Course Handling Faculty :M.R.Ezilarasan		
1.	VTU21366	BITTU KUMAR	AB	AB
2.	VTU23240	SOMA SURENDRA BABU	AB	AB
3.	VTU23595	ANANDHA KUMAR M	4	0

Action Taken :

1. Extra classes were conducted for slow learners.
2. Slip test conducted

Improvement Observed :

NIL

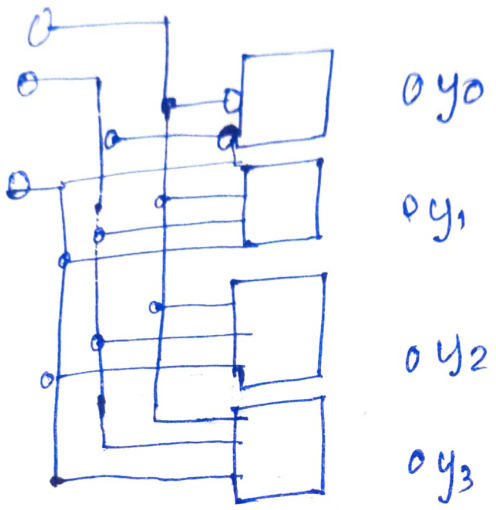
Faculty Sign

Course Coordinator

HOD ECE

23595- Anandhakumar

2. Verilog code for 1 to 4 Demux structure / Gate level modelling.




```
module demux1_to_4()
    input d,
    input s0,
    input s1,
   output y0,
   output y2,
   output y3,

  not(s1n, s1); (s0n, s0);
and (y0, d, s0n, s1n) -(y1, d, s0, s1n);
  (y2, d, s0n, s1). (y3, d, s0, s1);
end module
```

SRAM cell is made up of flip flop comprising of two cross coupled named. coupled inverters Two acess transistor are used to acess the stored in the cell. These transistor are turned on/OFF by the control line is connected to the output of row decoder circuit

The cycle time is the amount of time required to per form a single read to write operation and reset the internal circuitry so that another operation can begins. Thime is usually designate by one completed clock cycle.

static hazard occur when a input change and it causes the output to change at some moment before output comes stated. Dynami hazard occur when output change for two adjacent input while the output change only one.

Each pair is static-1 hazard
lets have an example: Example - consider the circuit shown below.

we have output say F as let decive K-map for this

Boolean function as follows.

The pair of 1 s encircled as green is not part of grouping 1 pairing provid by the output of Boolean function

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VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024
LIST OF SLOW LEARNERS – ACTION PLANNED REPORT

TTS No: **3619**

Course Handling Faculty: **Dr. R.Remya**

Course Code & Title: **10211EC103 / DIGITAL ELECTRONICS**

Course Category: **Programme Core**

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : F		**Course Handling Faculty :** Dr R.Remya		
1.	VTU21673	VANIPENTA CHANDRA REDDY	C	05
2.	VTU22990	NIMMAKAYALA KARTHEEK KUMAR REDDY	C	09
3.	VTU23612	PENGONDA VENKATA ROHITH KUMAR	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty Sign **Course Coordinator** **HOD ECE**

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC103/Digital Electronics

Course Coordinator : Dr. G. Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : F		**Course Handling Faculty :** Dr.R.Remya			
1.	VTU21673	VANIPENTA CHANDRA REDDY	5	9	RA
2.	VTU22990	NIMMAKAYALA KARTHEEK KUMAR REDDY	7	16	D
3.	VTU23612	PENGONDA VENKATA ROHITH KUMAR	a	a	NE

Action Taken:
Conducted special class and slip test.
Instructed the students to present the answers in a legible way.

Improvements Observed:

One student got improved

Faculty

Course Coordinator

HOD Sign

memorize the function

VTU 2562 Sonith

$F = (A,B,C,D) = \Sigma m(1,3,4,6,8,9,11,13,15) + \Sigma d(0,2,14)$

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	X	1	1	X
$\bar{A}B$	1			1
AB		1	1	X
$A\bar{B}$	1	1	1	

$\cancel{\bar{A}\bar{B} + \bar{A}\bar{C}\bar{D} + \bar{A}C\bar{D} + AD + A\bar{B}\bar{C}\bar{D}}$

$\rightarrow \bar{A}\bar{B} + \bar{A}\bar{D} + \bar{B}\bar{C} + AD + \bar{B}D$

$\Rightarrow \bar{A}\bar{B} + \bar{A}\bar{D} + \bar{B}\bar{C} + AD + \bar{B}D$

11/15

2

② obtain the manual SOP expressing using k-Map

$Y = \Sigma m(7,8,9) + \Sigma d(10,11,12,13,14,15)$

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$				
$\bar{A}B$			1	
AB	X	X	X	X
$A\bar{B}$	1	1	X	X

$\cancel{A\bar{B} + BCD}$

$A + BCD$

Ans ?

4

③ $\Sigma(0,1,2,4,5,6,8,9,12,13,14)$ using gates

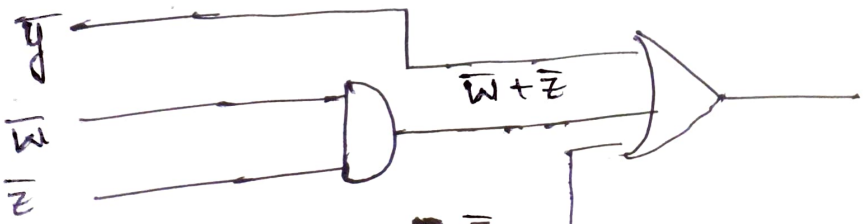
	$\bar{y}\bar{z}$	$\bar{y}z$	yz	$y\bar{z}$
$\bar{w}\bar{x}$	1	1		1
$\bar{w}x$	1	1		1
wx	1	1		1
$w\bar{x}$	1	1		

$= \cancel{\bar{A}C\bar{D} + C + BC\bar{D}}$

$= \cancel{\bar{y} + \bar{w}x\bar{z} +}$

$= \bar{y} + \bar{w}y\bar{z} + x\bar{z}$

5



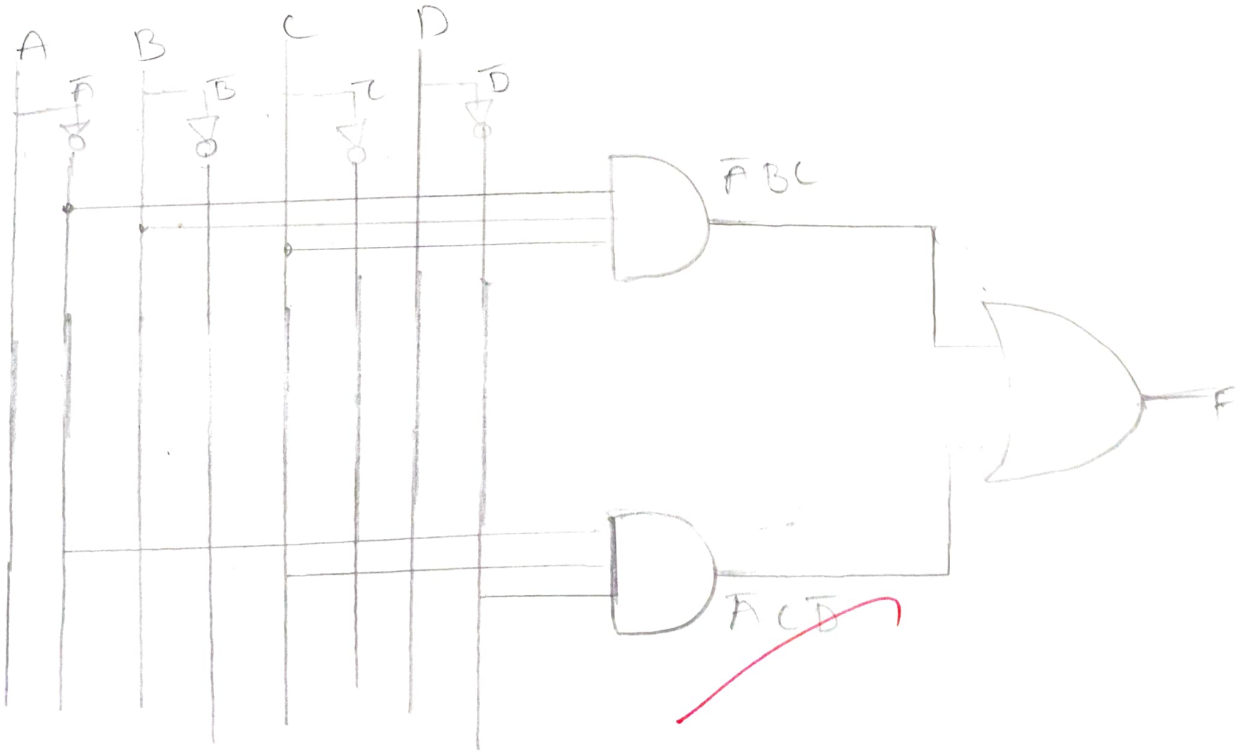
VTU 22031

1) Consider your 5-digit VTU number as output function and then realize the logic circuit.

The 5-digit VTU NO is 2,3,6,5,2

AB \ CD	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	1	1 3	1 2
$\bar{A}B$	4	1 5	7	1 6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

$F = \bar{A}BC + \bar{A}C\bar{D}$



- Write a Verilog code in gate level modelling for simulation of the 3x8 decoder

```
module decoder_3x8 (
  input wire [2:0] input_bits
  output reg [7:0] output_bits
);
  always @(*)
   begin
   case (input_bits)
   3'b000; output_bits = 8'b00000001;
   3'b001; output_bits = 8'b00000010;
   3'b010; outputs_bits = 8'b00000100;
   3'b011; output_bits = 8'b00001000;
   3'b100; output_bits = 8'b00010000;
   3'b101; output_bits = 8'b00100000;
   3'b110; output_bits = 8'b01000000;
   3'b111; output_bits = 8'b10000000;

  end case
  end
  end module
```

3) Design synchronous a bit upcounter using JK-FF

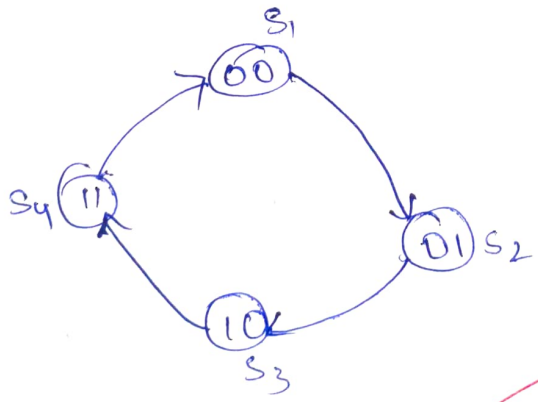
JK-FF

Exitation table.

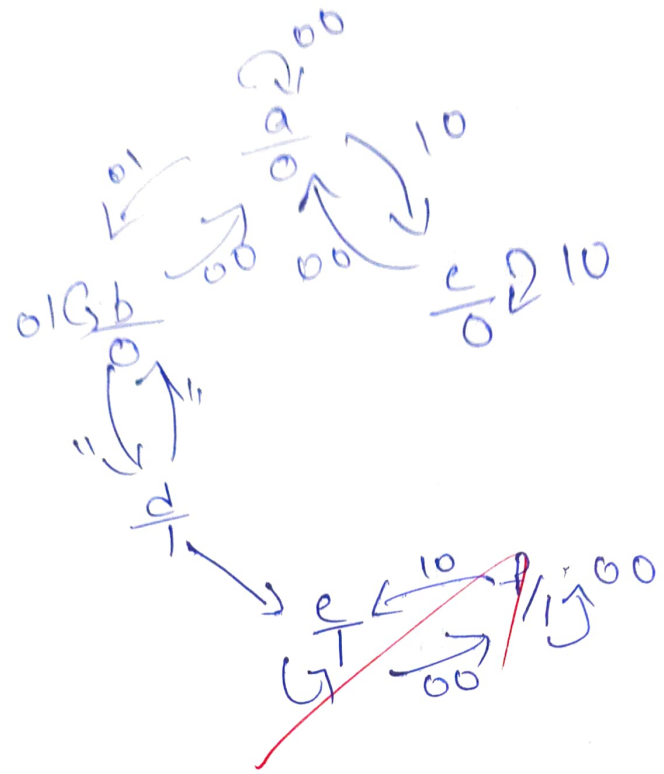
Qn	Qn+1	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

state diagram

2 FF for 2 bit $= 2^n = 2^2 = 4$



state diagram



Primitive flow table

P.S	N.S O/P			
	00	01	11	10
a	a, 0	b, –	–, –	c, –
b	a, –	b, 0	d, –	–, –
c	a, –	–, –	d, –	c, 0
d	–, –	b, –	d, –	e, –
e	f, –	–, –	d, –	e, 1
f	f, 1	b, –	–, –	e, –

a, b, c → S_0 → 0

d, e, f → S_1 → 1

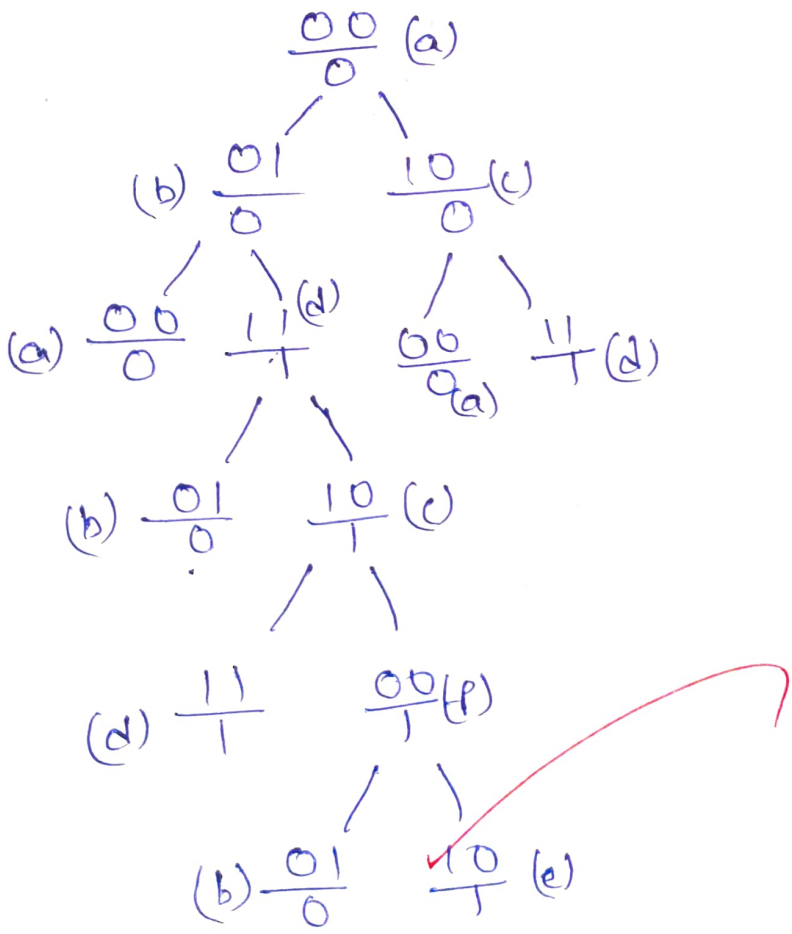
P.S	N.S O/P			
	00	01	11	10
S_0	a, 0	b, 0	d, –	c, 0
S_1	f, 1	b, –	d, 1	e, 1

P.S	N.S Op(Z)			
	00	01	11	10
0	00	00	1, –	00
1	11	0, –	1, 1	1, 1

4) Design an asynchrous sequential circuit in gated fated with two inputs A and B and output Q such that whatever B is 1 input A is transferred to Q and when B is 0 output remains in the same state even if A changes its value

A & B Input	B=1, Q=A
Q output	B=0, Q=prev o/p

flow diagram

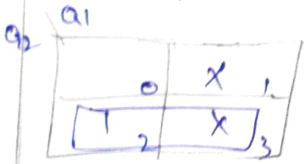


Truth table

Q_1	Q_2	Q_1^*	Q_2^*	J_1	K_1	J_2	K_2
0	0	0	1	0	X	1	X
0	1	1	0	1	X	X	1
1	0	1	1	X	0	1	X
1	1	0	0	X	1	X	1

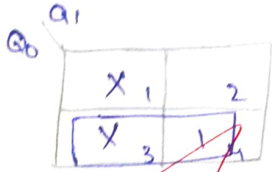
k-map

for J_1



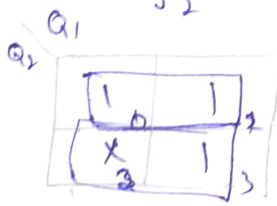
$J_1 = Q_2$

K_1



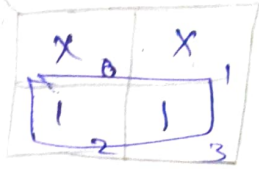
$K_1 = Q_2$

J_2



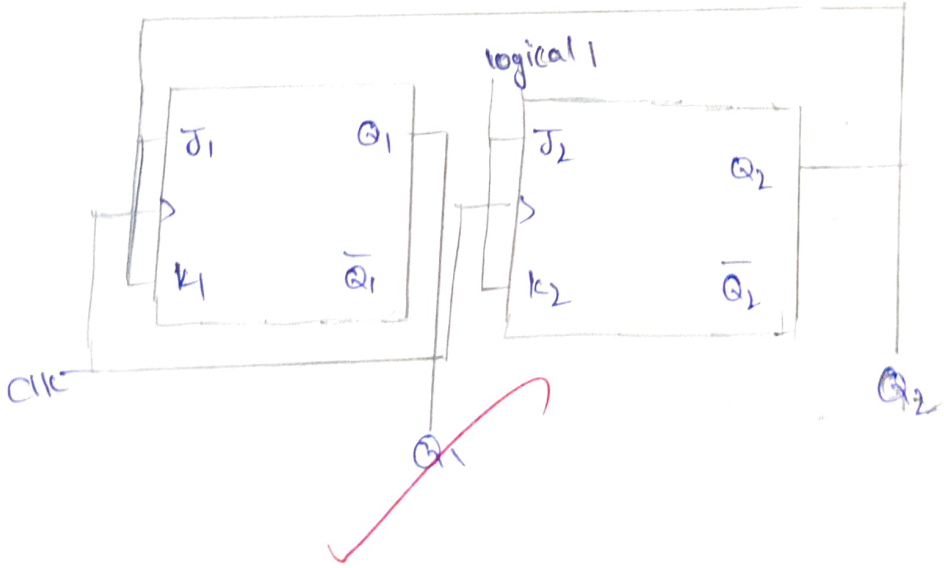
$J_2 = 1$

K_2



$K_2 = 1$

Logic diagram



Realization

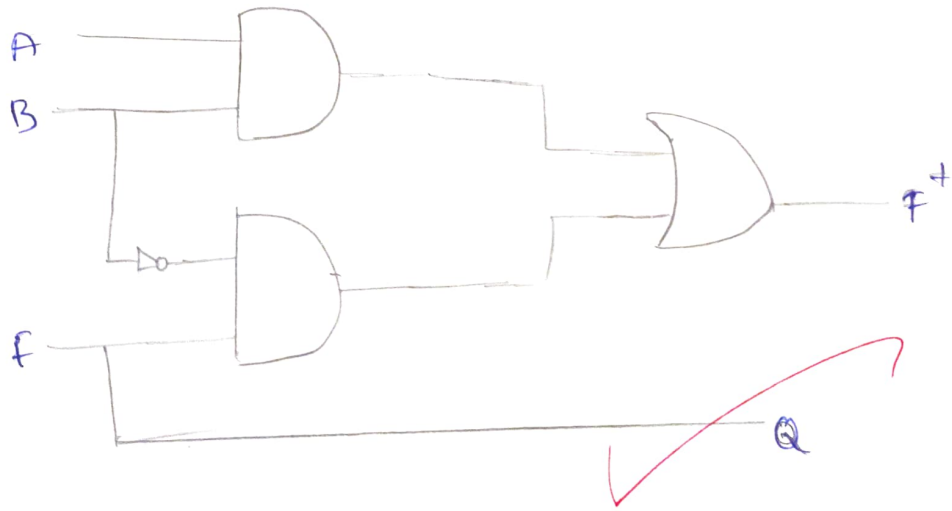
f \ AB	00	01	11	10
0			1	
1	1		1	1

$f = fB + AB$

f \ AB	00	01	11	10
0			X	
1	1	X	1	1

$Q = f$

Implemenatation:

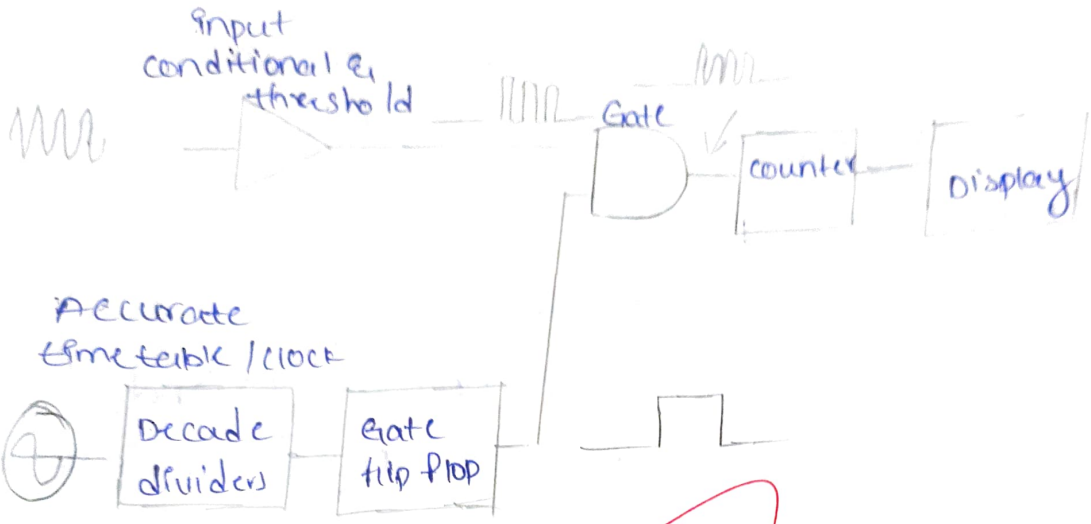


In digital electronic, counter are used to count the no. of pulses or events that have occured counters store the data and made up of a group of flip flop with an applied clock signal, counters are capable of measuring frequency and time along with the counting process these can increment memory adressing according to the application

counters are divided into two type: synchronous counter and asynchronous counter

The test instruments which are associated with a wide range of radio frequencies that frequency and time of repeated digitial signal accurately. These are also known as frequency meters.

When the no. of pluse or events occured in a specific period of time, the counter counts the pluse and transfers it to frequency counter to display the frequency range of pluse and counter is set to zero. It is very fast to use to measure the frequency



Input

When the input signal with the input impedance is applied to this counter, then it will be feed to the amplifer to convert the signal into a square wave or rectangle wave for processing within the digital circuit. The input signal is buffer and amplified by using

Gate

The accurate enabling pulse from the flip flow and counter the no. of pulses from

Display

The output of the counter and the latch are given to the display to provide output The most commonly used displays are LCD and LED

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VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC103 and Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : G		**Course Handling Faculty :** Dr D Preethi		
1.	VTU23701	VADLAMUDI RAKESH	C	2
2.	VTU23703	SHAIK YAKUB PASHA	C	6
3.	VTU23822	KARASALA SAI CHARAN TEJA	C	0

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Preethi.D
Faculty

Course Coordinator

HOD Sign

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DEPARTMENT OF ECE
VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC103 and Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : G		Course Handling Faculty : Dr D Preethi			
1.	VTU23701	VADLAMUDI RAKESH	6	AB	RA
2.	VTU23703	SHAIK YAKUB PASHA	3	AB	RA
3.	VTU23822	KARASALA SAI CHARAN TEJA	1	AB	NE

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed:

Two students showed improvement in Test 2

Preethi.P
Faculty

Course Coordinator

HOD Sign

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DEPARTMENT OF ECE
VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024
SLOW LEARNER ATTENDANCE

Course Handling Faculty: **Dr. D Preethi**

Course Code & Title: **10211EC103 / Digital Electronics**

Course Category: **Programme Core**

TTS No: **3620**

Sec: **G**

Exam: **Test I**

S. No.	VTU No.	Name of the Student	ATTENDANCE									
			21.08	21.08	23.08	28.08	30.08	04.09	06.09	11.09	11.09	13.09
			6	8	8	8	8	8	8	6	8	8
1	VTU23701	VADLAMUDI RAKESH	a	a	1	2	3	4	5	6	7	8
2	VTU23703	SHAIK YAKUB PASHA	1	2	a	3	4	5	6	7	a	8
3	VTU23822	KARASALA SAI CHARAN TEJA	1	2	3	4	a	5	a	6	7	8
ABSENTEES			1	1	1	0	1	0	1	0	1	0
FACULTY SIGN												

Preethi.P
Faculty Sign

Course Coordinator

ASMP
HOD ECE

Vel Tech
Rangarajan Dr. Sagunthala

School of Electrical and Communication

Department of Electronics and Communication Engineering

Summer Semester 2023-2024

Individual Time Table

[Included Slow Learner Schedule]

Dr. D Preethi

Day/ Hour	I 08:45 am 09:35 am	II 09:45 am 10:35am	III 10:45 am 11:35 am	IV 11:45 am 12:35 pm	12:35 pm 01:45 pm	V 01:45 pm 02:35 pm	VI 02:45 pm 03:35 pm	VII 03:45 pm 04: 35 pm	VIII 04:45 pm 05: 35 pm
Mon					LUNCH		DE*		DE*
Tue									DE*
Wed									
Thu									
Fri									
Sat									

DE*: Slow Learner Hours

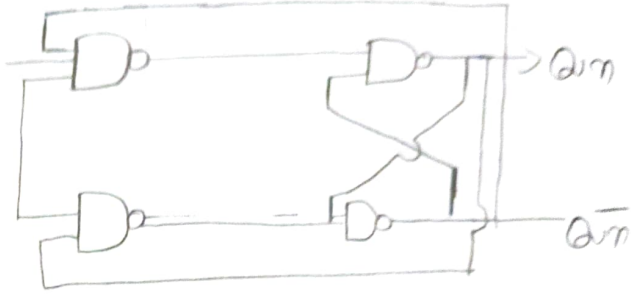
8/10

V. Rakesh
VTU23701
Digital Electronics

Date: 11/9/23

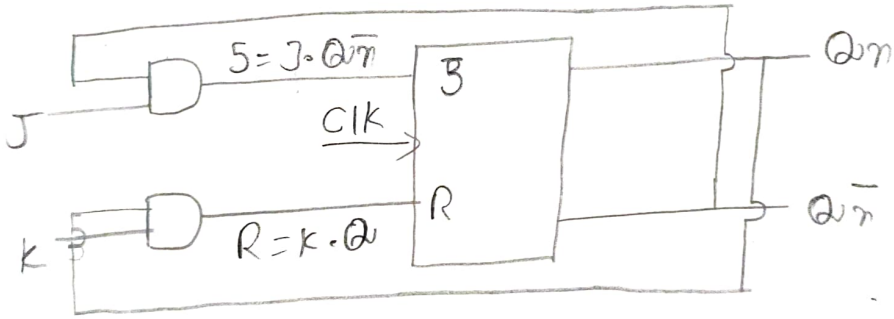
1. Desrive the characteristic equation and excitation table of JK Flip Flop using NAND gate / {T-FF/D-FF}





Analysis:

* SR FF with slight modification for JK FF is shown blow:

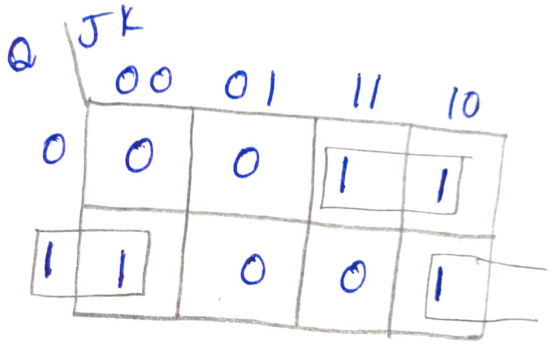


J	k	Qn	$\bar{Q}n$	S=J·$\bar{Q}n$	R=K·Qn	Qn+1
0	0	0	1	0	0	0
0	0	1	0	0	0	1
0	1	0	1	0	0	0
0	1	1	0	0	1	0
1	0	0	1	1	0	1
1	0	1	0	0	0	1
1	1	0	1	1	0	1
1	1	1	0	0	1	0

J	K	Qn+1
0	0	Qn
0	1	0
1	0	1
1	1	Qn

Chracterstic table for JK

Qn	J	K	Qn+1
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0



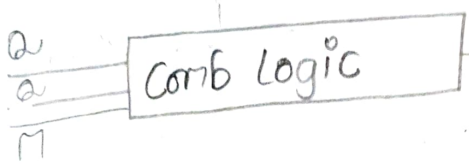
$Qn+1 = Qn\bar{K} + \bar{Q}nJ$

Excilation Table for JK

Qn	Qn+1	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

With suitable illustration discuss the design procedure of 3bit Asynchronous up/Do conter using J-K FF{ D-FF) T-FF^x }

Block diagram [Step1]

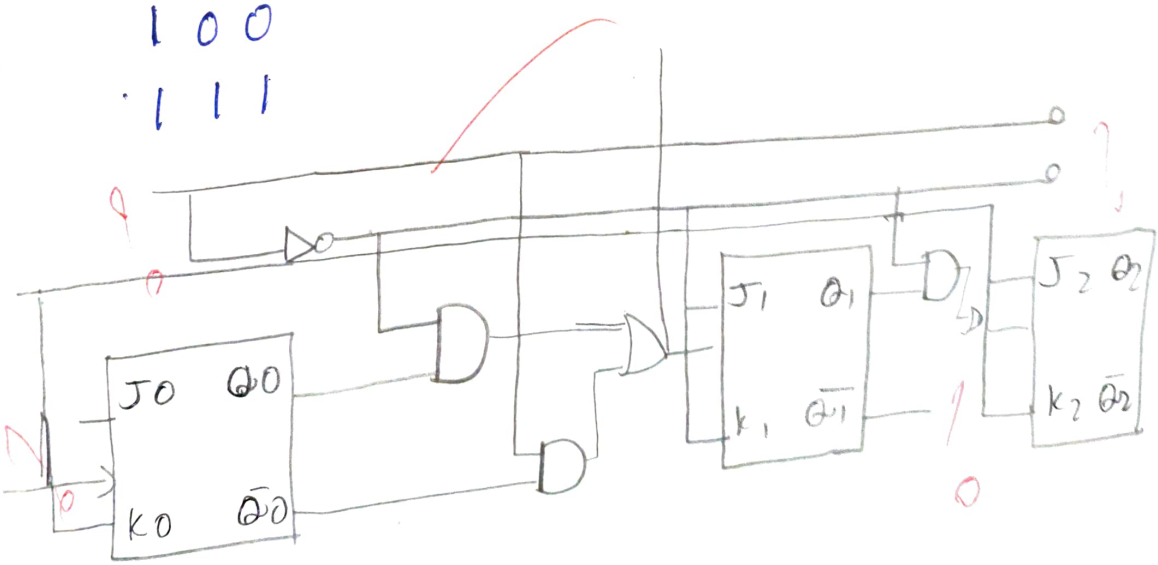


Y {Given as i/p clk pulse too}

M	Q	$\bar{Q}$	Y
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

M \ 00	01	11	10
0	0	1	1
1	1	1	0

$V = \bar{M}Q + M\bar{Q}$



Step1: Draco the block diagram with i/p's o/p's

Step2: Write the TT for up/down counter and get the o/p 'y'

Step3: Desode the no. of FF's and draco the logic diagram.

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SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : E		**Course Handling Faculty :** Dr Debashish Pal		
1.	VTU21515	KOTIPALLI PONY VINAY KUMAR	C	10
2.	VTU22143	RAMIREDDY MUKESH REDDY	C	8
3.	VTU23352	KESU GURU PRASAD	C	AB
4.	VTU23676	GEDALA SHANKAR BHAGAVAN	C	AB
5.	VTU23735	NARREDDY PULLA REDDY	C	7
6.	VTU23461	BANKA GOPI	C	AB
7.	VTU23607	SHAIK FAREED BAIG	C	AB
8.	VTU23672	SURA KARTHIKEYA	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : A E		Course Handling Faculty : Dr Debashish Pal			
1.	VTU21515	KOTIPALLI PONY VINAY KUMAR	15	9	D
2.	VTU22143	RAMIREDDY MUKESH REDDY	AB	4	RA
3.	VTU23352	KESU GURU PRASAD	1	AB	NE
4.	VTU23676	GEDALA SHANKAR BHAGAVAN	AB	AB	NE
5.	VTU23735	NARREDDY PULLA REDDY	AB	AB	NE
6.	VTU23461	BANKA GOPI	AB	AB	NE
7.	VTU23607	SHAIK FAREED BAIG	AB	AB	NE
8.	VTU23672	SURA KARTHIKEYA	AB	18	D

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed:

Two students showed improvement in test 2 and test 3

Faculty

Course Coordinator

HOD Sign

me- Dr. Debashish Pal
[TTS 3574]

SLOW LEARNERS

SEM: 5th

COURSE: DIGITAL ELECTRONICS

CLASS

Month	Aug	Sep			Oct		
Date	28/8	4/9	11/9	25/9	16/10	19/10	26/10
Hour	6	6	6	6	6	4	4
VTU	A	P	A	P	P	P	P
21515 KOTIPALLI PANY VINAY KUMAR	P	A	P	A	P	P	P
22143 RAMIREDDY MUKESH REDDY	A	A	P	P	A	A	P
23352 KESU GURU PRASAD	A	A	A	A	A	A	A
23676 GEDALA SHANKAR BHAGAVAN	A	A	A	A	A	A	A
23735 NARREDDY PULA REDDY	A	A	P	A	A	A	A
23461 BANKA GOPI	A	A	A	A	A	A	A
23607 SHAIK FAREED BAIG	P	P	P	A	P	P	P
23670 SURA KARTHIKEYA							
No. of Absentees	6	6	4	6	5	5	4	4
Initials								

NAME : K. pony vinay kumar

VTU : 21515

course code :

Single bit comparator

Truth Table

Inputs		Outputs		
A	B	A<B	A=B	A>B
0	0	0	1	0
0	1	1	0	0
1	0	0	0	1
1	1	0	1	0

k-map simplification

A \ B	$\bar{B}$	B
$\bar{A}$	0	(1)
A	(1)	0

$Y_{A<B} = \bar{A}B$

$\therefore Y_{A<B} = \bar{A}B$

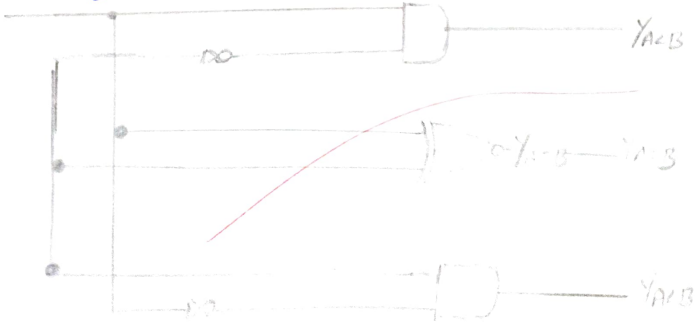
A \ B	$\bar{B}$	B
$\bar{A}$	0	0
A	(1)	0

A \ $\bar{B}$	$\bar{B}$	B
$\bar{A}$	(1)	0
A	0	(1)

$Y_{A=B} = \overline{A\bar{B}} + AB$

$= \overline{A \oplus B}$

Logic diagram



2-bit comparator

Truth table

Inputs				Outputs		
A_1	A_0	B_1	B_0	A<B	A=B	A>B
0	0	0	0	0	1	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	0	1	0
1	0	1	1	1	0	0
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	0	0	1
1	1	1	1	0	1	0

Karnaugh map simplification

A_1A_0 \ B_1B_0	00	01	11	10
00	0	0	0	0
01	1	0	0	0
11	1	1	0	1
10	1	1	0	0

$A>B = A_0\bar{B}_1\bar{B}_0 + A_1\bar{B}_1 + A_1A_0\bar{B}_0$

A=B

A_1A_0 \ B_1B_0	00	01	11	10
00	1	0	0	0
01	0	1	0	0
11	0	0	1	0
10	0	0	0	1

A<B

A_1A_0 \ B_1B_0	00	01	11	10
00	0	1	1	1
01	0	0	1	1
11	0	0	0	0
10	0	0	1	0

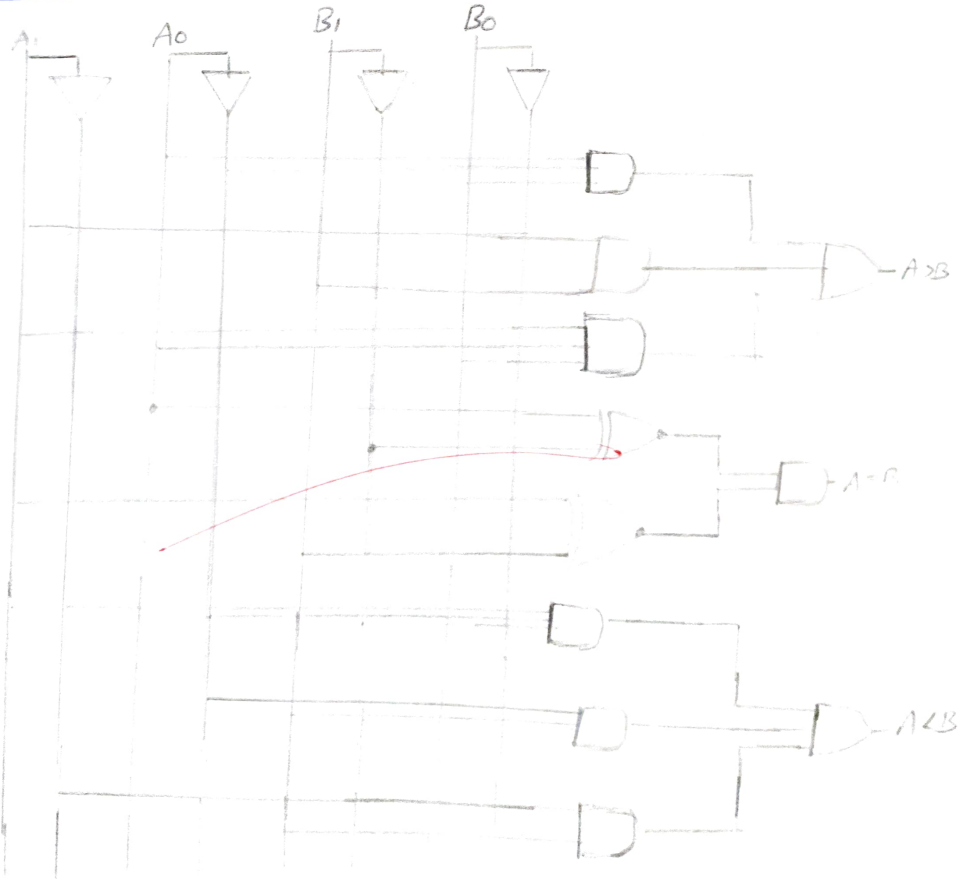
$$(A=B) = \bar{A}_1 \bar{A}_0 \bar{B}_1 \bar{B}_0 + \bar{A}_1 A_0 \bar{B}_1 B_0 + A_1 A_0 B_1 B_0 + A_1 \bar{A}_0 B_1 \bar{B}_0$$

$$= \bar{A}_1 \bar{B}_1 (\bar{A}_0 \bar{B}_0 + A_0 B_0) + A_1 B_1 (A_0 B_0 + \bar{A}_0 \bar{B}_0)$$

$$= (A_0 \odot B_0)(A_1 \odot B_1)$$

$$(A<B) = \bar{A}_1 \bar{A}_0 B_0 + \bar{A}_0 B_1 B_0 + \bar{A}_1 B_1$$

Logic Diagram



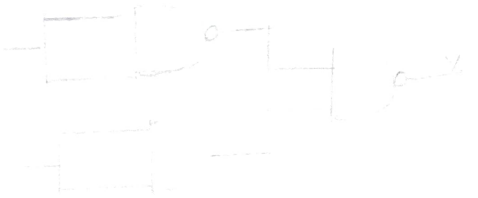
1. Implemention using NAND gate:

(a) NOT gate $Y = A'$



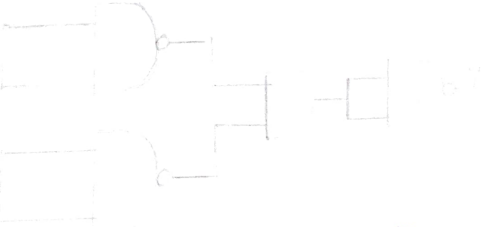
A	Y
0	1
1	0

(b) ~~AND~~ OR gate : $Y = A + B$



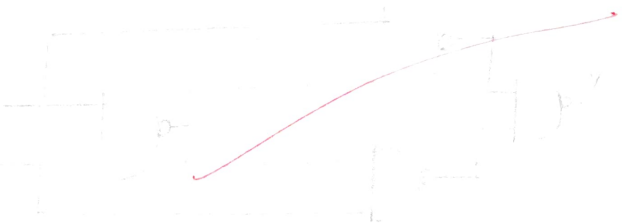
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(c) NOR gate : $Y = \overline{A+B}$



(e) Ex-OR gate $Y = A \oplus B$

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0



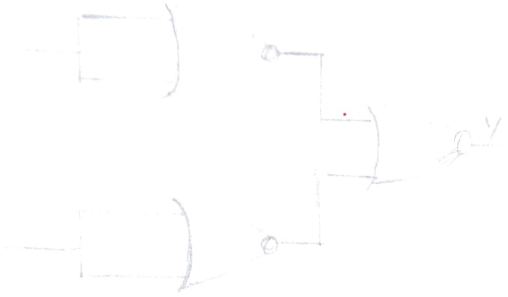
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

II. Implementation using NOR gate:

(a) NOT gate: $Y = A'$

A	Y
0	1
1	0

(b) AND gate: $Y = A \cdot B$



A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(c) OR gate: $Y = A + B$



(d) NAND gate: $Y = (AB)'$



A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(c) Ex-NOR gate $Y = A \odot B = (A\,B)'$

0	0	1
0	1	0
1	0	0
1	1	1



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(Deemed to be University)

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTU R 2021

Summer Semester 2023 – 2024
B.Tech. – ECE
QUESTIONS FOR SLOW LEARNERS

Faculty Name: Dr. Debashish Pal **SECTION: E**
Course Category: Programme Core
Course Code/Course Title: 10211EC103/ Digital Electronics
Semester: Summer **Date: 30-10-2023**

Answer any two questions

S. No.	Questions
1.	Discuss about design of 1 bit and 2 bit Comparator.
2.	Realize different logic gates using universal gate.
3.	Derive the minimized expression of the following function using K-Map F[A,B,C,D] = {1,2,5,7,8,10,13}
4.	Discuss about any one logic gate in detail.
5.	Discuss about Multiplexers and Demultiplexers using suitable examples.
6.	Discuss Half adders and Full adders.

Multiplexers

K. Ram prasad
VTU 23352
Digital Electronics

Multiplexers :-

Multiplexers is a digitals Switch Which Allows digit Information from Severals Source stable routed On Information from to a Single Output line and a Single Output line the Selection of a particular input line is Controlled by a let of a particular input line is Controlled by a Set of Selection lines. Normally there are 2nd input lines and Selection lines whose bit Combinations determine Which input is Selected.

A Demultiplexer is a Circuit that receives information An a singles line and Transmits this Information On One of 2nd possible Output lines. the Selection of Specific output line is Controlled by the values of 'n' Selections lines.

Truth Table :-

S. No	Selection S_1	Input S_2	Output y_0
1	0	0	y_0
2	0	1	y_1
3	1	0	y_2
4	1	1	y_3

De multiplexer :-

Module de multiplexer 1-4 (Din, S_1-S_2, y_0-y_0, y_1, y_2, y_3);

Output y_0;
Output y_1;
Output y_2;
Output y_3;
Input Din;

Truth Table

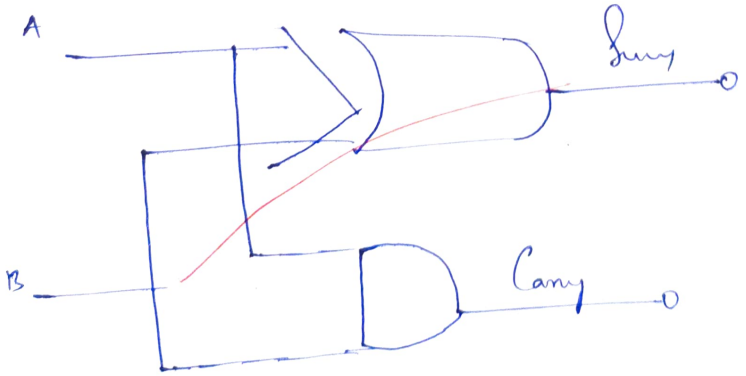
S.NO	Input			Output			
	S_1	S_2	Din	y_0	y_1	y_2	y_3
1	0	0	0	0	0	0	0
2	0	0	1	1	0	0	0
3	0	1	0	0	0	0	0
4	0	1	1	0	1	0	0
5	1	0	0	0	0	0	0
6	1	0	1	0	0	1	0
7	1	1	0	0	0	0	0
8							

Half Adder

Half Adder -

A Half Adder is a Combinational Circuit that can be used to add two Binary bits. It has two Inputs that represent the two bits to be added and two Outputs, with One producing the carry, the Sum can be applied cyling Ex-OR gate, Carry Output can be applied using and AND gate

Truth Table :-



Input		output	
A	B	Sum	Carry
0	0	0	0
0	1	1	0

Full Adder

Full Adder :-

A Full Adder is a Combinational Circuit that forms the arithmetic sum of three input bits. It Consists of 3 inputs and 2 outputs two of the inputs Variables represent the significant bits to be added. The Third input represents the Carry from previous lower significant position. The logic diagram of the Full Adder can also be implemented with two half Adders and One OR gate. The Output from the second half adder is the EX-OR of Cin and the Output of the first half-adder

```
Module half Adder (a,b, Sum, Carry);
    input a,b,c;
    Output Sum Carry;
    wire x,y,z;
    * xor x1 (x,a,b);
      and x2 (y,a,b);
    * or x3 (Sum x);
      and x4 (z,a,c);
      or x5 (Carry,y,z);
End Module.
```

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH. – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC103 & Digital Electronics

Course Coordinator : Dr. G. Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	T-I
Section : I		Course Handling Faculty : Dr. J. Arun Kumar		
1.	VTU22031	GURRAM UDAY KIRAN	C	AB
2.	VTU22098	VAGATHURU CHARAN	C	AB
3.	VTU22113	NADENDLA VISHNU VARDHAN	C	AB
4.	VTU22317	AMANJEET SINGH	C	AB
5.	VTU23409	EDUBILLI APPALA NAIDU	C	AB
6.	VTU23660	SHAIK HARRIS	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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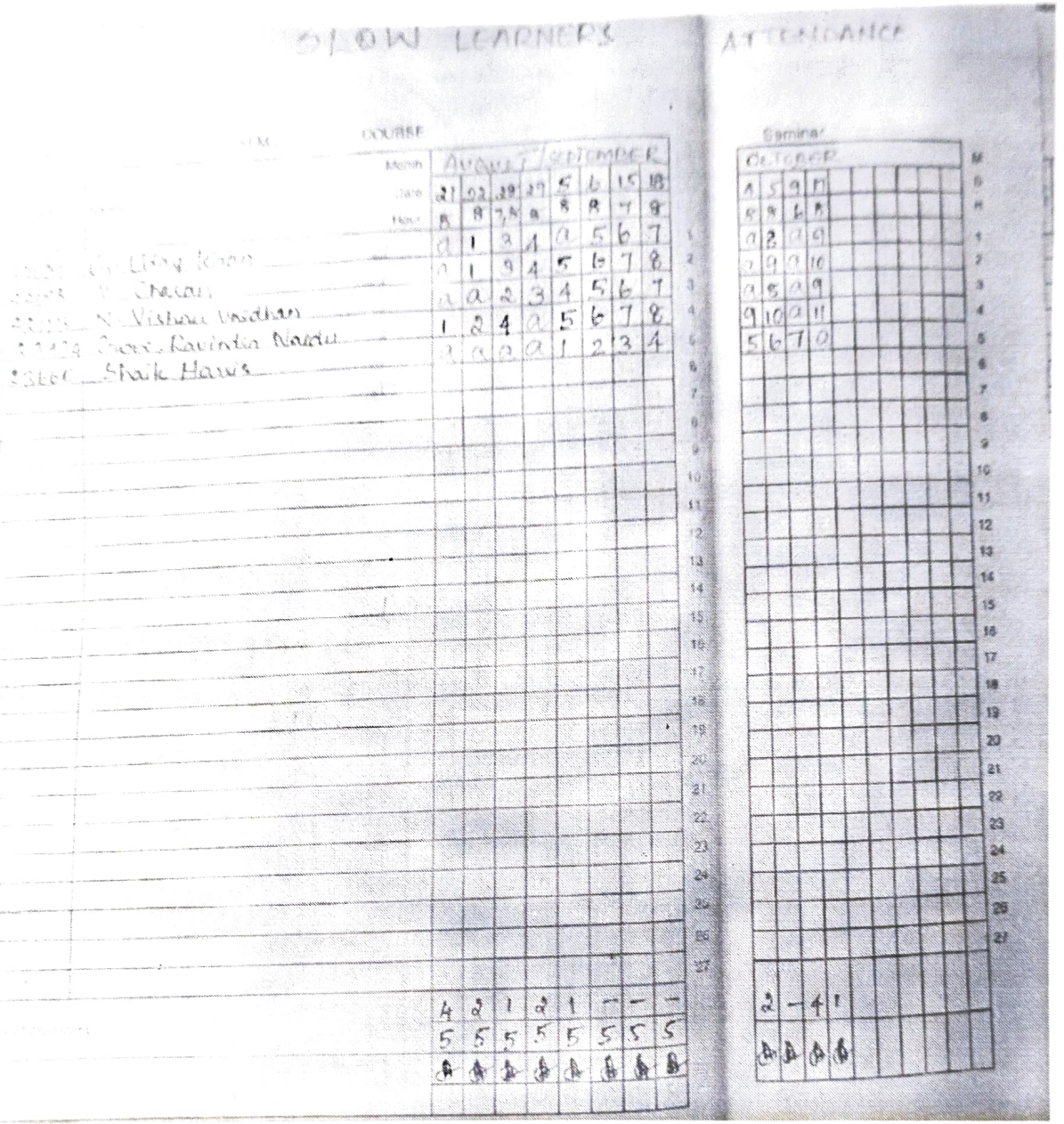
School of Electrical and Communication

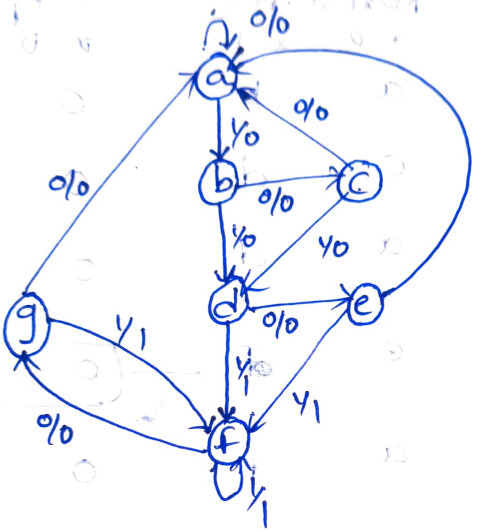
Department of ECE



G. Daniyelu.
VTU: 23754

(1.)

Construct reduce state diagram?



present state	Next state		output	
	x=0	x=1	x=0	x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f ←	0	1
f	g	f	0	1
g	a	f ←	0	1

Present state	Next state		Output	
	$x=0$	$x=1$	$x=0$	$x=1$
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	d	0	1
e	a	d	0	1



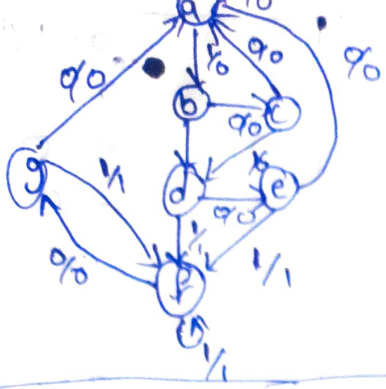


g=e

present state	Next state x=0	Next state x=1	output x=0	output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	e	f	0	1

f=d

present state



VTU: 21803

NAME: G. Venkatesh

Present state	Next State x=0	Next State x=1	Output x=0	Output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f		

$g = e$

Present State	Next State x=0	Next State x=1	Output x=0	Output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	e	f	0	1

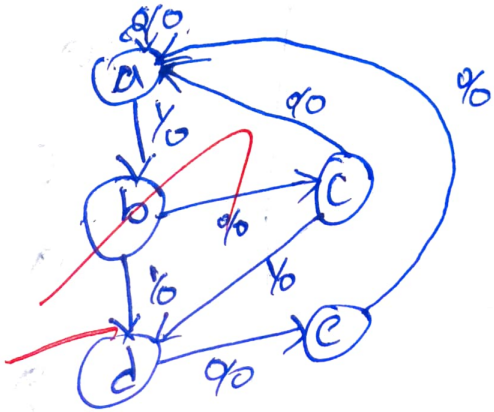
$f = d$

Fig

Present State	next State x=0	next State x=1	
a	a	b	
b	c	d	
c	a	d	
d	e	d	
e	a	d	

output diagram:





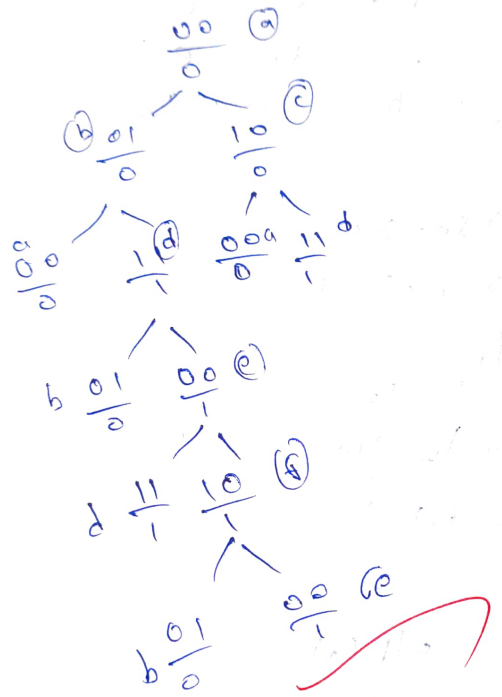
G.Venkata gopi

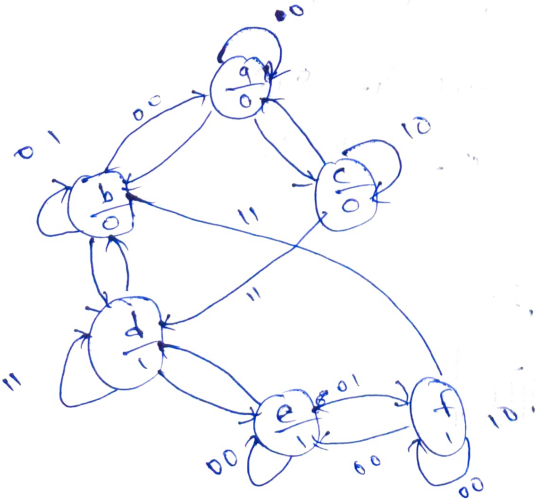
VTU: 2.3749

-) Flow diagram

x & y = input | y, z = 0, z = x

z = output | z = previous output





P.S	N.S 00	01	11	10
a	a,-	b,-	d,-	c,-
b	a,0	~~b,0~~ -,-	d,-	-,-
c	a,-	b,0	d,-	c,0
d	-,-	b,-	d,1	e,-
e	f,-	-,-	d,-	e,1
f	f,1	b,-	-,-	e,-

a,b,c → S0 → 0

d,e,f → S1 → 1

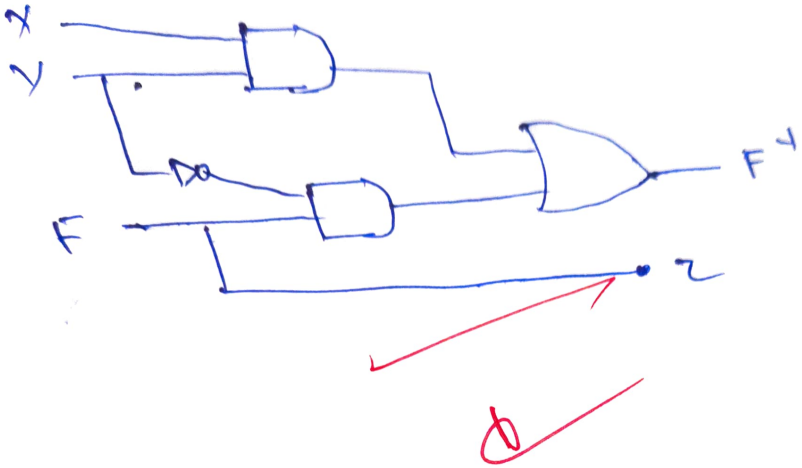
	NS 00	o/p 01	11	10
S0	a,0	b,0	d,-	e,0
S1	f,1	b,-	d,1	e,1

P.S (F)	P.t (NS) 00	o/p (x) 01	11	10
0	0,0	0,0	1,-	0,0
1	1,1	0,-	1,1	1,1

Realisation:

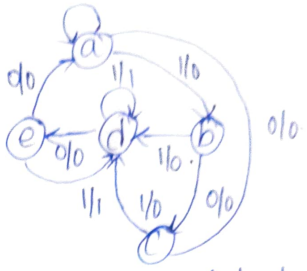
F \ xy	00	01	11	10
0			1	
1	1		1	1

lementation:

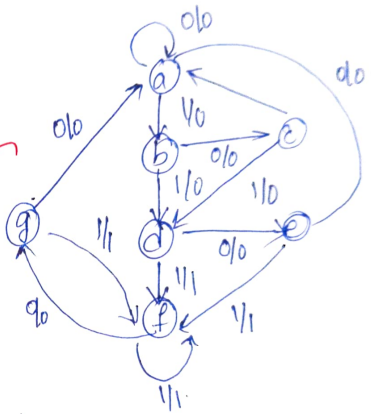


Reg no: 15582 Digital Electronics Date : 17/10/23

Present state	next state x=0	next state x=1	output x=0	output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f	0	1



Output



① $q = e$ put $q = e$ from ①

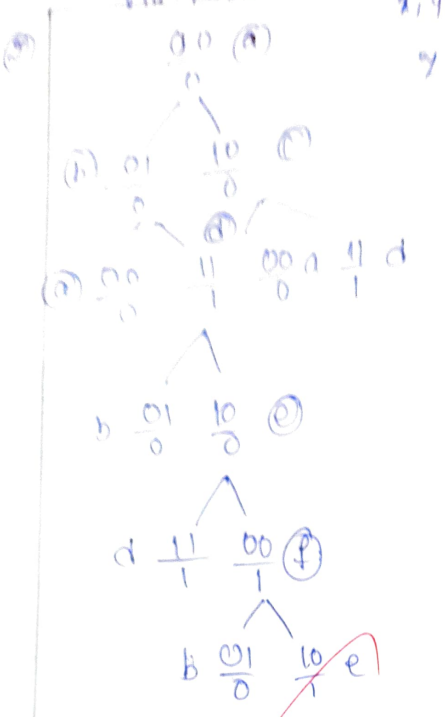
Present state	next state x=0	next state x=1	output x=0	output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	e	f	0	1

② $f = d$ put $f = d$ from ②

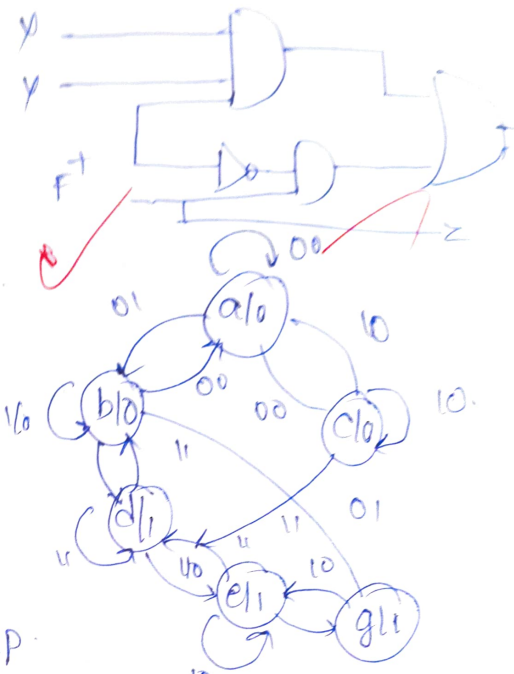
present state	next state x=0	next state x=1	output x=0	output x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	d	0	1
e	a	d	0	1

x, y Input

y output



Premitive flow table

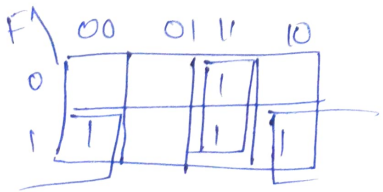


Present State	next state 00	01	o/p 11	10
a	(a,0)	b,-	-,-	c,-
b	a,-	(b,0)	d,-	-,-
c	a,-	-,-	d,-	c,0
d	-,-	b,-	(d,1)	e,-
e	f,-	-,-	d,-	e,1
f	f,1	b,-	-,-	e,-

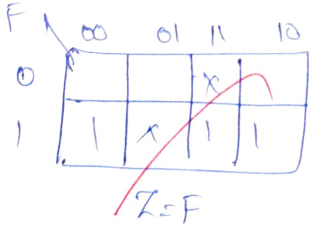
a, b, c → S_0 → 0

d, e, f → S_1 → 1

Pos	Nos 00	01	o/p 11	10
S_0	a,0	b,0	d,-	c,0
S_1	f,1	b,-	d,1	e,1



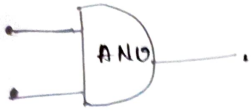
$F^+ = F\bar{y} + xy$



OE :-

M. Anjali
VTU : 23300

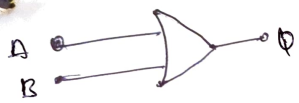
AND gate :



Truth table :

Input		output
x	y	z
0	0	0
0	1	0
1	0	0
1	1	1

OR gate :



Truth table :-

Input		output
0	0	0
0	1	1
1	0	1
1	1	1

NOT gate :



Truth Table :

A	B
0	1
1	0

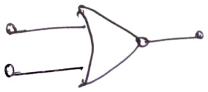
NAND gate :



Truth Table

B	A	Q
0	0	1
0	1	1
1	0	1
1	1	0

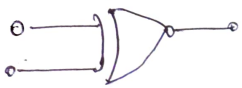
NOR gate :



Truth Table

B	A	Q
0	0	1
0	1	0
1	0	0
1	1	0

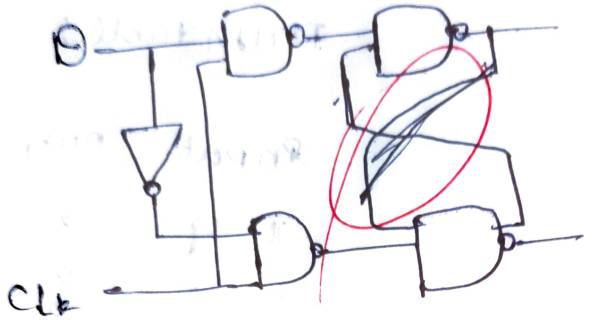
Ex or gate :



Truth Table :-

B	A	Q
0	0	1
0	1	0
1	0	0
1	1	1

9 - FlipFlop :-



T - Flip Flop :-

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC103 - Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test-I
Section : J		**Course Handling Faculty :** Dr.R.Sathesh Raaj		
1	VTU23422	ANURAJULA RANGA RAKESH	C	1
2	VTU23566	POLIBOINA GURU MANOHAR	C	9.5

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

Course Handling Faculty : Dr R Sathesh Raaj **Section : J**

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
1.	VTU15582	PALLAPU MADHAVI	10	19	NE
2.	VTU21803	GUNTUPALLI VENKATESH	7.5	4	AB
3.	VTU22354	YEMINENI KARTHIK	12	10.5	D
4.	VTU23300	MADAMANCHI ANJALI	5	10	D
5.	VTU23566	POLIBOINA GURU MANOHAR	2	0	D
6.	VTU23609	TAMMISETTI DHANAMURTHY	5	9	RA
7.	VTU23627	SEELAM ROHITH REDDY	10.5	3	D
8.	VTU23747	GUNJI VENKATA GOPI	8	16	D
9.	VTU23754	GUDURI DANIYELU	7	17	D

Action Taken:
- Gave important questions through question bank
- Conducted special class for important topics

Improvements Observed:
- Three students showed improvement in test 3

R. Sathesh Raaj
Faculty

Course Coordinator

HOD Sign

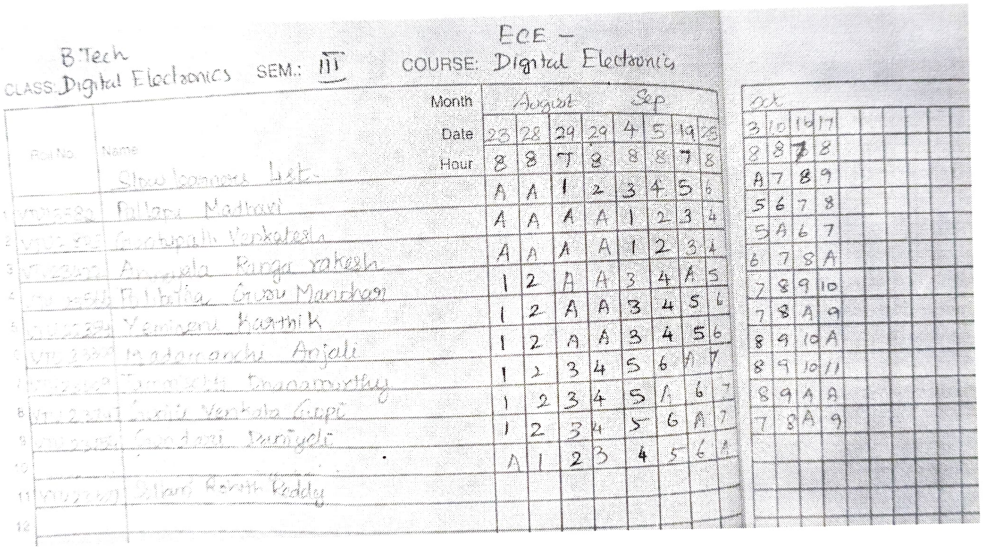
SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

SLOW LEARNERS ATTENDANCE

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

Course Handling Faculty : Dr R Sathesh Raaj **Section :** J



R. Sathesh Raaj
Faculty

Course Coordinator

HOD Sign

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title: Linear Integrated Circuits
Date after Test-1: 23/08/2023
Academic Year: 2022-2023
CourseCode:10211EC104
Course Coordinator: Dr.Vignesh Prasanna N
Semester: Summer
Course Handling Faculty: Dr.Selwin Mich Priyadharson.A/Dr.M.Prabha (Section A)

S.No.	VTU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU23145	SAROJJ KUMAR M	6	C
2.	VTU23510	GEDELA VINAY SAI KUMAR REDDY	1	C
3.	VTU23676	GEDALA SHANKAR BHAGAVAN	AB	C

Reason for Low Performance:

1. Attendance percentage is below expectations.
2. Concepts and problem presentations have been inadequate.

Action Planned:

1. Inform the respective mentors of the low attendance percentage and test scores.
2. To handle Previous Year University Papers about how to present the answers in exam

Course Handling Faculty **Course Coordinator** **HoD/ECE**

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

se Title :Linear Integrated Circuits
emic Year :2023-2024
se Coordinator : Dr.Vignesh Prasanna.N
se Handling Faculty : Dr.Nanmaran R (Section B)

Date after Test-1 :23/08/2023
CourseCode:10211EC104
Semester : Summer

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU23724	REDDY SUNIL YAKKANTI	5	C
2.	VTU22130	VEMIREDDY VENKATA REDDY	8	C
3.	VTU23735	NARREDDY PULLA REDDY	1	C

eason for Low Performance:
1. Not attentive and not regular to the class
2. Students struggles to understand circuit concepts

ction Planned:
1. Instructions given to attend classes regularly through mentors
2. Remedial class planned for them. One hour for one unit planned for the remedial class.

urse Handling Faculty

Course Coordinator

HoD/ECE

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Academic Year :2022-2023
Course Coordinator : Dr.Vignesh Prasanna N
Course Handling Faculty : Dr.Vignesh Prasanna.N (Section C)

Date after Test-1 :23/08/2023
CourseCode:10211EC104
Semester : Summer

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU21107	KANUBOINA VENKATA RAMA KISHORE	AB	C
2.	VTU21515	KOTIPALLI PONI VINAY KUMAR	2	C
3.	VTU21686	KANALA INDRANEEL	AB	C
4.	VTU21920	SRINATH	0	C
5.	VTU22584	LOKESH REDDY	AB	C
6.	VTU22588	KALKI JAI PRAKASH REDDY	0	C
7.	VTU23240	SOMA SURENDRA BABU	AB	C
8.	VTU23294	KONATHAM RAMI REDDY	AB	C
9.	VTU23422	ANURAJULA RANGA RAKESH	9	C
10.	VTU23573	ALLU KARTHIK	AB	C
11.	VTU23595	ANANDHA KUMAR. M	AB	C
12.	VTU23667	YADLA SATYA SAI	5	C

Reason for Low Performance:

1. Most of the students were reported to classes after 3 weeks of course commencement.
2. Not regular to the class and absent for Test-1
3. Lack of preparation for Test-1

Action Planned:

1. Class test planned to conduct
2. Special classes planned to conduct.
3. Instructions will be given how to present the answers neatly.

Course Handling Faculty

Course Coordinator

HoD/ECE

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DEPARTMENT OFECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Date after Test-1 :23/08/2023

Academic Year :2022-2023
CourseCode:10211EC104

Course Coordinator : Dr.Vignesh Prasanna N
Semester : Summer

Course Handling Faculty : Dr.Purushothaman V (Section E)

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU23703	SHAIK YAKUB PASHA	AB	C

Reason for Low Performance:

1. Mistakes in diagram and derivation

Action Planned:

1. Conducted slip test

Course Handling Faculty **Course Coordinator** **HoD/ECE**

Vel Tech
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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Date after Test-1 :23/08/2023
Academic Year :2023-2024
CourseCode:10211EC104
Course Coordinator : Dr.Vignesh Prasanna N
Semester : Summer
Course Handling Faculty : Dr.K.E.Purushothaman (Section F)

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU21366	Bittu Kumar	AB	C
2.	VTU21673	Vanipenta Chandra Reddy	AB	C
3.	VTU22031	Gurram Uday Kiran	0	C
4.	VTU22098	Vagathuru Charan	1	C
5.	VTU22113	Nadendla Vishnu Vardhan	3	C
6.	VTU22525	Kollala Mohan Krishna	AB	C
7.	VTU23352	Kesu Guru Prasad	AB	C
8.	VTU23461	Banka Gopi	AB	C
9.	VTU23589	Marneela Vishnu Vardhan	1	C
10.	VTU23607	Shaik Fareed Baig	AB	C
11.	VTU23728	Ragavan P	AB	C

Reason for Low Performance:

1. Did not prepare well for the exam.

Action Planned:

1. Extra classes to be conducted.

K.E. purushothaman
Course Handling Faculty

Course Coordinator

HoD/ECE

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Date after Test-1 :23/08/2023
Academic Year :2022-2023
CourseCode:10211EC104
Course Coordinator : Dr.Jeen Retna Kumar R
Semester : Summer
Course Handling Faculty : Dr.Jeen Retna Kumar R (Section S7)

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU22375	K RAGHUL	AB	C
2.	VTU23300	MADAMANCHI ANJALI	AB	C
3.	VTU23406	MAHESWARAN M	1	C
4.	VTU23409	EDUBILLI APPALA NAIDU	AB	C
5.	VTU23566	POLIBOINA GURU MANOHAR	AB	C
6.	VTU23785	AKULA SAI	AB	C
7.	VTU23837	BATTULA HEMANTH KUMAR	AB	C
8.	VTU24266	AKSHAYA PRASAD R	AB	C

Reason for Low Performance:
1. Not prepared well for exam

Action Planned:
1. **Conducting Coaching class, slip test**

Course Handling Faculty **Course Coordinator** **HoD/ECE**

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr. Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : H		**Course Handling Faculty :** Dr. Rahul S G		
1.	VTU23440	JUTURU JAYA RAKESH	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- The student attended only six classes before the conduction of Test-1.

Action Planned:

- Slip test will be conducted periodically.
- Follow-up will be done through mentor.

Faculty **Course Coordinator** **HoD Sign**

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DEPARTMENT OFECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Date after Test-1 :23/08/2023
Academic Year :2023-2024
CourseCode:10211EC104
Course Coordinator : Dr.Vignesh Prasanna N
Semester : Summer
Course Handling Faculty : Dr.A.ROSI (Section H)

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU22143	RAMIREDDY MUKESH REDDY	4	C
2.	VTU22990	NIMMAKAYALA KARTHEEK KUMAR REDDY	2	C
3.	VTU23609	TAMMISETTI DHANAMURTHY	9	C
4.	VTU21553	SANNAPA REDDY GANESH	1	C
5.	VTU21792	RAGHUL K	AB	A
6.	VTU22000	TULUGU BHEEMARAJU	AB	A
7.	VTU22045	NANDIMANDALAM SAI SIVA	AB	C
8.	VTU22262	VADDI SREENIVASULU	AB	A
9.	VTU22362	DHARINEESH A D	AB	C
10.	VTU23217	NAREN S	AB	C
11.	VTU23311	MEDARAMETLA SRINIVAS	AB	B
12.	VTU23612	PENGONDA VENKATA ROHITH KUMAR	AB	C
13.	VTU23568	MUKESH R	AB	A
14.	VTU23618	CHERKA LOKESH	AB	A
15.	VTU23680	NAGAM MOUNISWAR REDDY	AB	A
16.	VTU23826	BELLAM KOTESWARA RAO	AB	C
17.	VTU23828	MANNEM RISHI VENKATA MANI	AB	B
18.	VTU27053	VENKATESWAR REDDY U	AB	LE

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Reason for Low Performance:

1. Did not prepare well for the exam.
2. Many absentees

Action Planned:

1. Extra classes to be conducted.
2. Extra test will be conducted

Course Handling Faculty **Course Coordinator** **HoD/ECE**

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DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Planned Report

Course Title :Linear Integrated Circuits
Academic Year :2022-2023
Course Coordinator : Dr.Vignesh Prasanna N
Course Handling Faculty : Dr.Senkumar.M.R (Section I)

Date after Test-1 :23/08/2023
CourseCode:10211EC104
Semester : Summer

S.No.	VtU No.	Name of the Student	Performance of the student	
			Test 1	Category
1.	VTU23672	SURA KARTHIKEYA	7	C
2.	VTU22687	NAYUDU HARISCHANDRA PRASAD	11	C
3.	VTU23690	PAMIDI TEJARAM	9	C
4.	VTU23699	UNGARALA ABHINAY SRINIVAS	3	C
5.	VTU23721	VISWANADHAPALLI MOHAN SAI	6	C
6	VTU23737	VELAVALA PALLI N D S S SRI RAM	1	C
7	VTU21707	PRAVEEN KUMAR E	5	C
8	VTU21772	YADAGINI SRINIVAS	2	C
9	VTU22573	POCHAMREDDY RAJA MOULISWAR REDDY	9	C
10	VTU23717	SIDDABATHULA VIJAY	8	C
11	VTU23743	BONTHU PRUDHVI	7	C
12	VTU23725	AKKICHIKOPPAM PRADEEP	5	C
13	VTU23720	ANALA VENKATA SAI SATEESH	1	C
14	VTU23707	DAVU SAI KUMAR	6	C
15	VTU23535	MALLEPALLY SIDDARTH REDDY	3	C
16	VTU23590	DEEPAK PANDEY	6	C
17	VTU23806	YETTI BHANU PRAKASH	9	C
18	VTU23647	SHAIK AFZAL	10	C
19	VTU22070	KOLA BHANU PRAKASH	4	C
20	VTU23579	UDHAYA PRASATH M	AB	C

21	VTU23675	VICTOR TIRKEY	AB	C
22	VTU23750	NAVEEN KUMAR	AB	C
23	VTU23768	HAARISH U	AB	C
24	VTU23738	CHAKKA NAVEEN KUMAR	AB	C
25	VTU23660	SHAIK HARRIS	AB	C
26	VTU22317	AMANJEET SINGH	AB	C
27	VTU23309	SEELLA VISWA TEJA	AB	C
28	VTU23342	J SRIPAD	AB	C
29	VTU23434	GONE RAVINDRA NAIDU	AB	C
30	VTU23859	MUMMADI BHANU PRAKASH REDDY	AB	C
31	VTU24270	SYED AKRAM	AB	C
32	VTU20232	LINGARAJU YOGA KARTHIKESWAR RAO	AB	C
33	VTU20990	RANGALA NAVEEN REDDY	AB	C

Reason for Low Performance:

1. Poor Students attendance.
2. Two exams conducted on same date (LIC + Data structure).

Action Planned:

1. Advised the students for regular attendance.
2. Positions revised again and class test conducted for the same

Course Handling Faculty **Course Coordinator** **HoD/ECE**

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DEPARTMENT OF ECE

VTUR UGE - 2021 B. TECH – ECE

SUMMER 2023 – 2024

List of Slow Learners – Action Planned Report

Course Title: **Linear Integrated Circuits** Date after Test-1: **23/08/2023**

Academic Year: **2023 - 2024** Course Code: **10211EC104**

Course Coordinator: **Dr.Vignesh Prasanna N** Semester: **Summer**

Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

S.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 1	Category
1.		NIL		
2.				
3.				
4.				
5.				

Reason for Low Performance:

1.

Action Planned:

1.

Course Handling Faculty **Course Coordinator** **HOD ECE**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021

List of Slow Learners – Action Taken Report

Course Title :Linear Integrated Circuits
Academic Year :2022-2023
Course Coordinator : Dr.Vignesh Prasanna N
Course Handling Faculty : Dr.Vignesh Prasanna.N (Section C)

Date after Test-3 :26/11/2023
CourseCode:10211EC104
Semester : Summer

S.No.	VtU No.	Name of the Student	Performance of the student		
			Test 2	Test 3	End Sem Result
1.	VTU21107	KANUBOINA VENKATA RAMA KISHORE	AB	AB	NE
2.	VTU21515	KOTIPALLI PONI VINAY KUMAR	1	2	D
3.	VTU21686	KANALA INDRANEEL	AB	AB	NE
4.	VTU21920	SRINATH	2.5	AB	NE
5.	VTU22584	LOKESH REDDY	1	9	RA
6.	VTU22588	KALKI JAI PRAKASH REDDY	0	6	D
7.	VTU23240	SOMA SURENDRA BABU	AB	AB	NE
8.	VTU23294	KONATHAM RAMI REDDY	AB	6	RA
9.	VTU23422	ANURAJULA RANGA RAKESH	2.5	AB	NE
10.	VTU23573	ALLU KARTHIK	AB	AB	NE
11.	VTU23595	ANANDHA KUMAR. M	1	AB	NE
12.	VTU23667	YADLA SATYA SAI	AB	AB	RA.

Action Taken:

- Extra classes conducted
- Students were irregular and absent to special classes and tests
- Seven students were became not eligible to the course.

Course Handling Faculty **Course Coordinator** **HoD/ECE**

Slow Learners

CLASS: SEM.: COURSE:

	Roll No.	Name	Month	Sep '23				Oct '23		
			Date	5	12	19	26	3	10	17
			Hour	8	8	8	8	8	8	8
1	VTU21107	Kanubina Venkata Rama Kishore		A	A	A	A	A	A	A
2	VTU21575	Kotipalli Vinay Kumar		A	A	A	1	2	3	4
3	VTU21686	Kanala Indraneel		1	2	A	A	A	A	A
4	VTU21920	Srinath		A	A	A	A	A	A	A
5	VTU22584	Lokesh Reddy		1	2	A	A	3	4	5
6	VTU22588	Kalai Jai Prakash Reddy		1	A	A	2	3	4	5
7	VTU23240	Soma Surendra Babu		A	A	A	A	A	A	A
8	VTU23294	Konatham Rami Reddy		A	1	2	A	3	A	4
9	VTU23422	Anuvavula Ranga Rakesh		1	2	3	4	A	A	5
10	VTU23573	Allu Karthik		A	1	A	A	A	A	A
11	VTU23595	Anandha Kumar. M		A	1	A	A	A	A	A
12	VTU23667	Yadla Satya Sai		1	2	3	A	4	4	5
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
		No. of Absentees		3	5	9	9	8	8	6
		Initials								

Absentees

RECORD OF CLASS WORK

Class: Semester: Course:

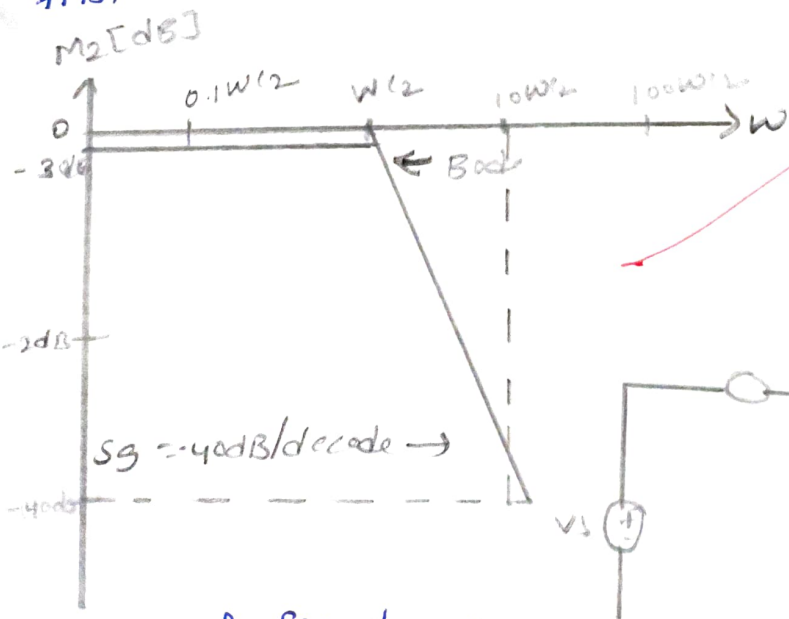
S. No.	Date	Topics covered	No. of periods	Initials		
				Faculty	CC/MC	H.O.D
1.)	5/9/2023	Unit-1 Functional block diagram of op-amp	1	[signature]	[signature]	
2.)	12/9/2023	Unit-2 Instrumentation amplifier	1	[signature]	[signature]	
3.)	19/9/2023	Differentiator & Integrator	1	[signature]	[signature]	
4.)	26/9/2023	Unit-3 Astable multi vibrator	1	[signature]	[signature]	
5.)	3/10/2023	Unit-4 Weighted resistor DAC	1	[signature]	[signature]	
6.)	10/10/2023	PLL - Block diagram	1	[signature]	[signature]	
7.)	17/10/2023	Unit-5 IC tuned amplifier	1	[signature]	[signature]	

① Design a second order chebycher LPF of frequency with a upper cut of frequency of 0.5 KHz.

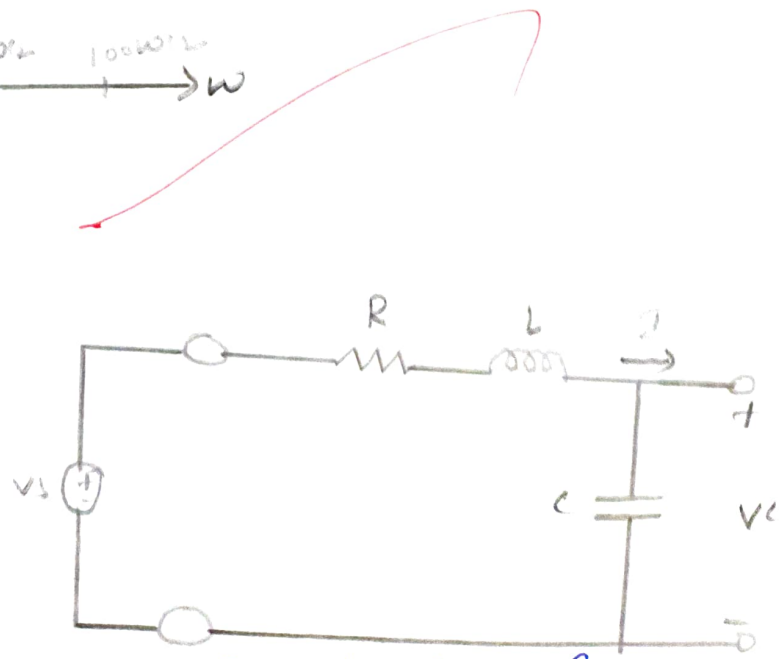
Ans:- To design a second order chebycher low-pass filter (LPF) with an upper cutoff frequency of 0.5 KHz, you need to select four parameters.

* Response:- High pass Corl low pass
* Cut off frequency :- The frequency where the gain falls to value of the ripple for the final time.
* percent ripple in the pass Band:- The percent-ripple in the pass band.
* Number of poles :- The number of poles

A second order low pass filter has the same frequency as a first order filter, but the stop band roll-off is twice the first order at 40dB / decade (12 dB/octave).



Response of Second-order filter



Second order filter.

ntify the IC used in the Television or audio signals?

A sound chip is an integrated circuit (chip) to produce audio signals through Digital, Analog (or) mixed-mode. Electronics. sound chips are typically fabricated on metal-oxide semiconductor (MOS) Mixed-Signal chips that prouns Audio signals.

Types:—

* programmable Sound generators
* Synthesis → wave-Table Synthesis
* Sampling → pulse-code modulation Sampling.

Applications:—

Sound chips are commonly used in various digital electronic devices particullarly personal computers, video game systems, electronics musical instruments and digital Telecommunications. Cincluding digital Telephony, Digital Television.

List of Sound Chips:—

Sound chips came in different forms and use a valiety of Techniques to genuate audio signals. a list of all of the different sound chips produced by a certain Company or manufacturs can be found in Sound chip Article.

26/9/25

K. Pony Vinay Kumar
VAU 21515

LPF

To design a second - order Bessel low - pass Filter (LPF) with a cut off frequency of 2.5kHz You can use the following formula to calculate the values for the components

1. Determine the values of the filter components

- C1 : The value of the first capacitor

C2 : The value of second capacitor

R1 : The value of the first resistor

R2 : The value of the second resistor

2. use the Bessel filter transfer Function :

H(s) = 1 / [ss^2 + 0.765s + 1)* (R1*R2* C1* C2)]

3. calculate the Bessel filter's corner frequency (wo):

wo = 2* π* 2.5kHz = 15.707 rad/s

4. set the denominator of the transfer function to match the Bessel filter characteristic (s^2 + 0.765s + 1) = wo^2

5 Design the analog filter circuit:

. you can implement analog filter using passive components like resistors and capacitors. The component values depend on the desired filter characteristics and you may need to perform further calculations

6. Convert the Transfer function to standard form

To get the transform function in standard form, you can normalize it by dividing all coefficients

$$H(s) = 1 / (s^2 + 1.4142s + 1)$$

The choice of an audio amplifier integrated circuit (IC) for a real-time application can vary depending on specific requirements

LM386: This is a popular and cost Effective choice for low-power audio amplification

TDA7294: suitable for medium power audio power audio applications. it can deliver good audio quality

LM1875: Another IC known for it's audio quality. it's used in low to medium-power amplifiers

TDA2050: A versatile IC with good power output, often used for medium-power audio amplification.

TDA7498: suitable for high-power audio amplification IC that allows for audio signal processing

Please note that the of IC should be based on your specific requirements and the characteristics of your - real time audio applications, as well as any advan ments

It's important to consult the latest datasheets and appi cation notes from IC manufacturis to make an informed decision

SCHOOL OF ELECTRICAL AND COMMUNICATION
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SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr. Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : D		**Course Handling Faculty :** Dr. Rahul S G			
Nil	Nil	Nil	Nil	Nil	Nil

Action Taken:

- No slow learners are identified in the class.

Improvements Observed:

- Nil slow learners.

Faculty **Course Coordinator** **HoD**

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : F		**Course Handling Faculty :** Dr.K.E.Purushothaman			
1.	VTU21366	Bittu Kumar	AB	AB	NE
2.	VTU21673	Vanipenta Chandra Reddy	24	7	D
3.	VTU22031	Gurram Uday Kiran	AB	AB	AB
4.	VTU22098	Vagathuru Charan	AB	AB	AB
5.	VTU22113	Nadendla Vishnu Vardhan	AB	7	RA
6.	VTU22525	Kollala Mohan Krishna	AB	AB	AB
7.	VTU23352	Kesu Guru Prasad	AB	AB	AB
8.	VTU23461	Banka Gopi	AB	AB	NE
9.	VTU23589	Marneela Vishnu Vardhan	25	15	A
10.	VTU23607	Shaik Fareed Baig	AB	AB	NE
11.	VTU23728	Ragavan P	16	15	D

Action Taken:

1. Slip tests were conducted.
2. Discussed about how to present each and every question in the CIA tests and university exam

Improvements Observed:

1. The Performance of one student is considerably improved in T2 after writing the retest.
2. One more student scored more than T1 but not a considerable improvement.

K.E.Purushothaman
Faculty Signature

Course Coordinator

HOD/ECE

Slow learners Name list

10211EC104
Linear Integrated Circuit

	August				September			
	28	29	30	4	11	12	9	10
	8	8	8	8	8	8	8	8
Bittu kumar	1	2	3	4	A	A	A	A
Vanpeta Chandra Reddy	1	A	A	A	2	3	4	5
Yagathuru charan	1	2	3	4	5	6	7	8
Nadendla Vishnu Vardhan	1	2	3	4	5	6	7	8
Kollala Mohan Krishna	1	2	3	4	5	6	7	8
Kesu Sai prasad	1	2	3	4	5	6	7	8
Banka Rosi	A	1	A	A	A	2	A	A
Nadendla Vishnu Vardhan	1	2	3	4	5	6	7	A
Shaik Rasheed Baig	1	A	A	A	A	A	A	A
Nagaraju P	1	2	3	4	5	6	7	8
Sushan Uday Kiran	1	2	3	4	5	6	7	8
	1	2	3	3	3	2	3	4
	f	f	f	f	f	f	f	f

Seminar

	October
	31
	8
	A
	7
	10
	10
	10
	10
	4
	8
	A
	10
	10
	2
	f

K.e. purushothamas

Slow learners list

RECORD OF CLASS WORK

Class I Semester Summer Course Linear IC's

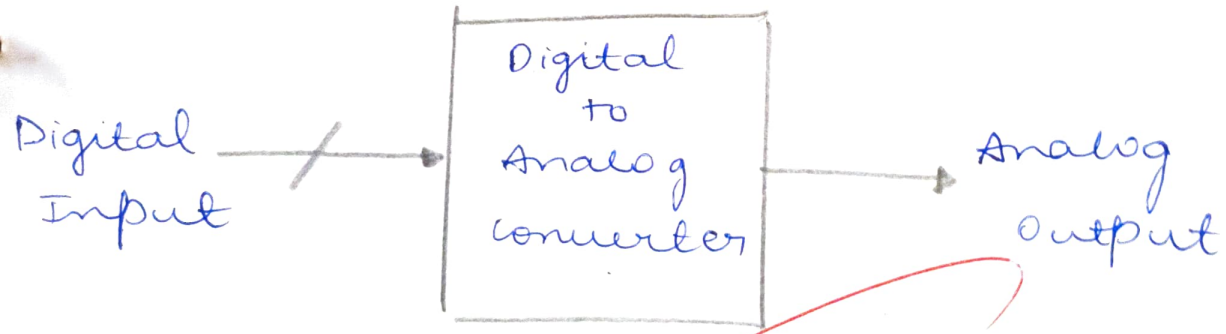
S No	Date	Topics covered	No of periods	Initials: Faculty	Initials: CC/MC	Initials: HOD
1.	28.8.23	OP.amp block diagram	1			
2.	29.8.23	Differential amplifier	1			
3.	30.8.23	Frequency compensation	1			
4	4.9.23	Instrumentation amplifier	1			
5	11.9.23	log and antilog amplifier	1			
6	12.9.23	Sine wave generator	1			
7	9.10.23	Block diagram of 555	1			
8	10.10.23	weighted resistor DAC	1			
9	11.10.23	Design of LPF	1			
10.	31.10.23	Block diagram of PLL	1			

K.e. purushothaman

Name: M. Vishnu Vardhan
VTU: VTU23589
Class: 'F' section
Subject: 10211EC104 Linear Integrated circuit

1) What is DAC? Explain the operation of weighted resistor DAC.

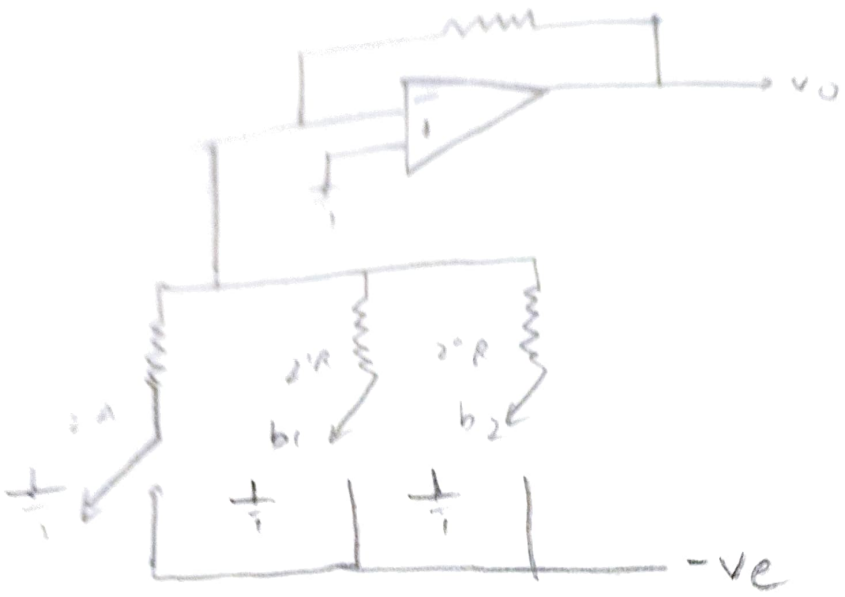
Ans:- A Digital to Analog converter (DAC) converts a digital input signal into an analog output signal. The digital signal is represented with a binary code, which is a combination of bits 0 and 1. This is as follows:-



There are two types of DACs

- weighted resistor DAC
- R-2R ladder DAC

DAC



- A weighted resistor DAC produces an analog output, which is almost equal to the digital binary.

The Nodal equation is :-

$$\frac{0 + V_R b_2}{2^0 R} + \frac{0 + V_R b_1}{2^1 R} + \frac{0 + V_R b_0}{2^3 R} + \frac{0 - V_o}{R_1} = 0$$

$$\rightarrow \frac{V_o}{R_1} - \frac{V_R B_2}{2^0 R} + \frac{V_R b_1}{2^1 R} + \frac{V_2 b_0}{2^1 R}$$

$$\rightarrow V_o = \frac{V_R R_1}{R} \left\{ \frac{b_2}{2^0} + \frac{b_1}{2^0} + \frac{b_0}{2^0} \right\}$$

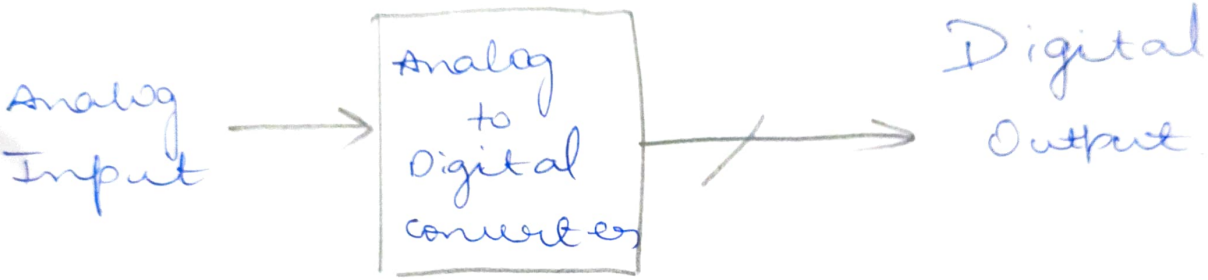
Substitute

$$\rightarrow V_o = \frac{V_R R_1}{R R_1} \left\{ \frac{b_2}{2^0} + \frac{b_1}{2^1} + \frac{b_0}{2^3} \right\}$$

$$\rightarrow V_o = \frac{V_R}{2} \left\{ \frac{b_2}{2^0} + \frac{b_1}{2^1} + \frac{b_0}{2^3} \right\}$$

) Demonstrate the working of flash type ADC

An analog to Digital converter converts an analog signal into a digital signal. which is a combination of bits 0 and 1



observe that an Analog to Digital converter (ADC) consists of a single analog input.

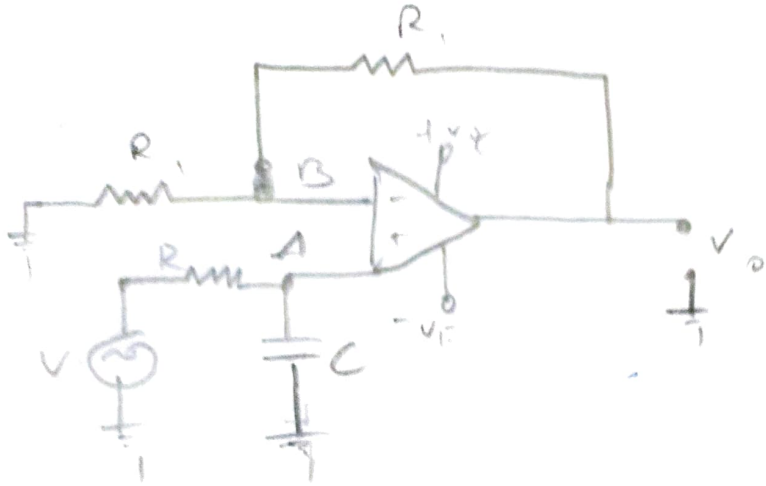
There are two types of ADC's Direct type ADCs and Indirect type ADC. This chapter discusses about the Direct type ADC in a detail

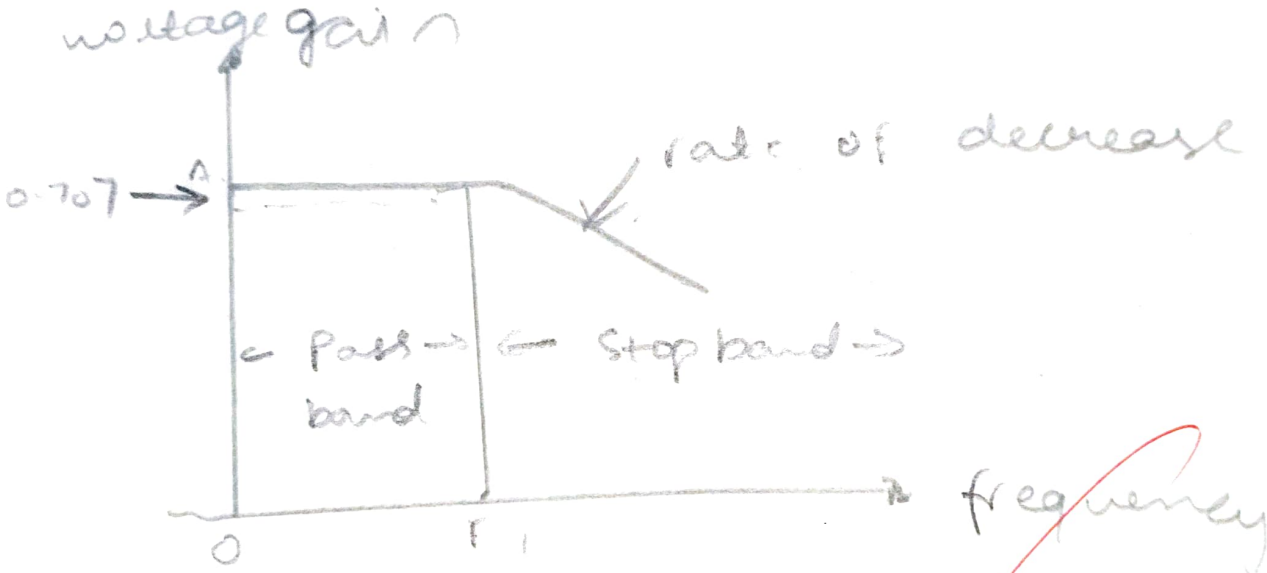
The following are the examples of Direct type ADC's:

- Counter type ADC
- Successive Approximation ADC
- Flash type ADC

(3) Define (LPF) with characteristics Design active low pass filter at a cut off frequency of KHz with pass band gain of 2.

Ans:- Butterworth filter is a type of filter whose freq. response is flat over the pass band region. low pass filter provides constant output from DC up to cutt off frequency and rejects all signals above that frequency it is realized by R-C circuit.





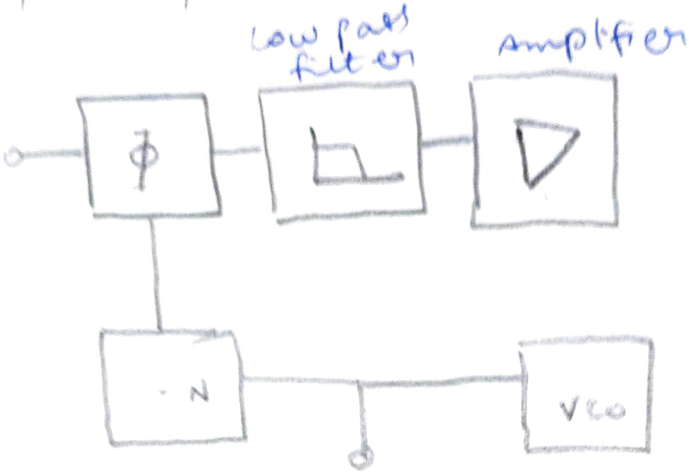
$$f_H = \frac{1}{2\pi R C}$$

$$A_F = 1 + \frac{R_1}{R_1}$$

4) Discuss.

(i) Frequency multiplication division

(ii) Frequency synthesizer

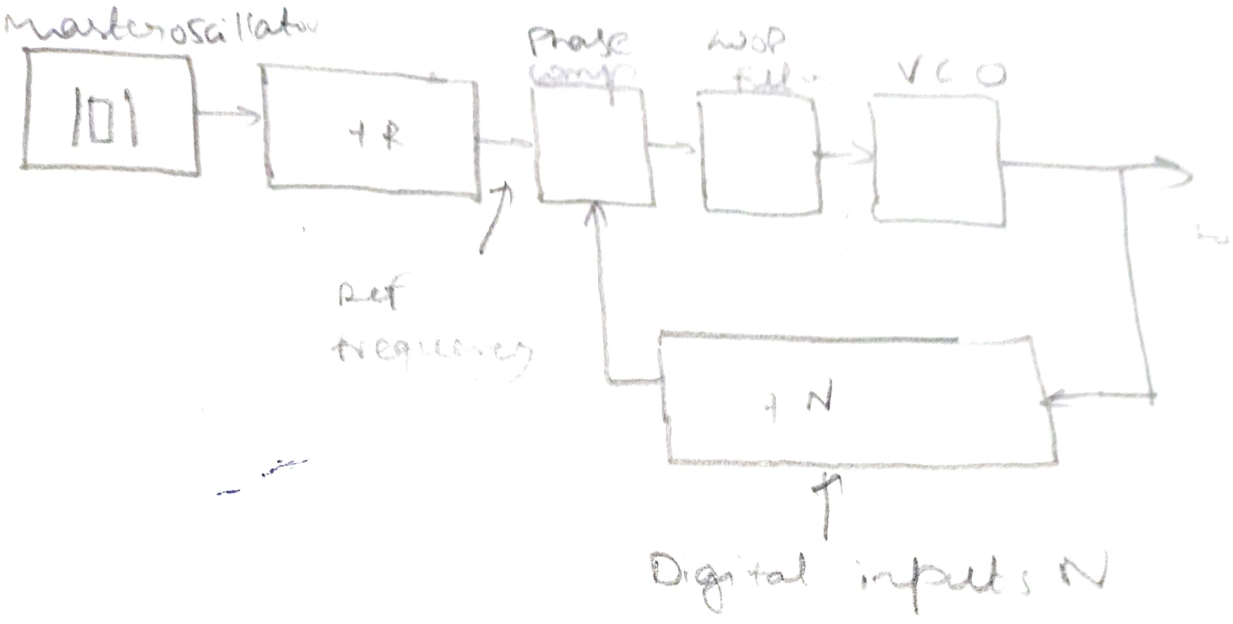


It is divide by N Network is an inserter btw the VCO output and the phase comperator input in the locked state, the VCO output frequency is fo is given by $f_o = Nf_c$.

The multiplication factor can be obtained by setting a proper scaling factor N for the counter.

PLL in its harmonic locking mode. If the Input signal is rich in harmonics e.g square wave, pulse train etc.

Frequency synthesis



If the output frequency drifts, the error signal will increase, driving the frequency in the ~~the~~ so as to reduce the error. Thus the output is locked to the frequency at the other input.

The key to the ability

The output frequency is fed through a frequency divider back to the input of the system.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Title :Linear Integrated Circuits

Academic Year :2022-2023 CourseCode:10211EC104

Course Coordinator : Dr.Vignesh Prasanna Semester : Summer

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			T 2	T 3	End Semester Result
Section : G		Course Handling Faculty : Dr.Jeen Retna Kumar R			
1.	VTU22375	K RAGHUL	10	15	RA.
2.	VTU23300	MADAMANCHI ANJALI	3	8	RA.
3.	VTU23406	MAHESWARAN M	7	AB	D
4.	VTU23409	EDUBILLI APPALA NAIDU	1	AB	AB
5.	VTU23566	POLIBOINA GURU MANOHAR	1	4	RA.
6.	VTU23785	AKULA SAI	AB	1	RA
7.	VTU23837	BATTULA HEMANTH KUMAR	AB	7	RA.
8.	VTU24266	AKSHAYA PRASAD R	10	20	D

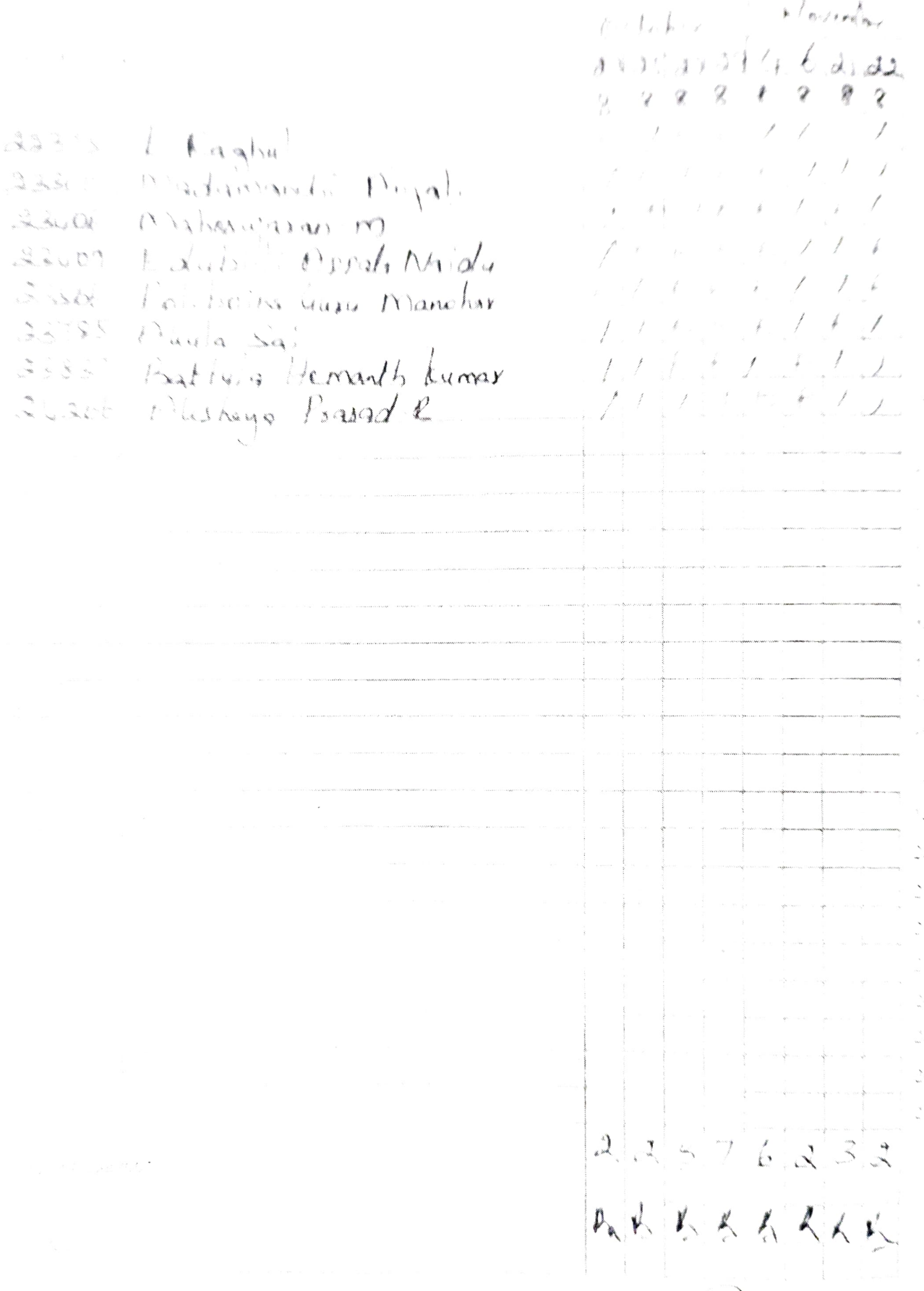
Action Taken:

1. **Important concepts and problems were discussed.**
2. **Slip tests were conducted.**
3. **Discussed about how to present each and every question in the CIA tests and university exam.**

Improvements Observed:

1. **Students did not show any improvement as they did not involve in attending coaching.**

Faculty **Course Coordinator** **HOD Sign**



Slow learners

RECORD OF CLASS WORK

Class: Semester: Course:

S No.	Date	Topics covered	No. of periods	Initials: Faculty	Initials: CC/MC	Initials: HOD
		Unit I				
1.	22/9/2022	Block Diagram of op-amp	1			
		Unit II				
2.	25/9/2022	Instrumentation Amplifier	1			
3.	27/9/2022	Clipper & Clamper circuits	1			
		Unit III				
4.	29/9/2022	Astable multivibrator	1			
5.	4/10/2022	Saw tooth wave generator	1			
		Unit IV				
6.	6/10/2022	Weighted resistor DAC	1			
7.	21/10/2022	Flash type ADC	1			
		Unit V				
8.	22/10/2022	Phase locked loop (PLL) & VCO	1			

Madamanchi Anjali
VTU 23300

Filters :

* A filter is often used in electronic circuits to block or allow a select frequency to the circuit.

* Filter is a frequency selective circuit that passes signal of specified band of frequencies and attenuates the signals of frequencies.

* Filters are classified as
  * Analog or digital filters
  * Active or passive filters
  * Audio (AF) or Radio Frequency (RF)

Types of filters :

* Active filters
* passive filters

Active Filters :

An active filter is a type of analog circuit implementing an electronic filter using active components, typically an amplifier included in a filter design can be used to improve the cost, performance and predictability.

Active filter used op-amp as the active element. By enclosing a capacitor in the feed back loop, inductor.

Passive Filters:

passive filter is the passive implemen of linear filter are based on combinations of resistors (R), inductors (L) and capacitor(C). These types are collectively known as passive filters, because they do not depend upon an external power supply and/or they do not contain active components.

passive filters workes well for the high frequencies. But at audio frequencies, the inductors become problematic as they become large, heavy and

High pass filter :

* A high pass filter is used in circuits that only require high frequencies to operate.

* It blocks most low frequencies & DC component. Here is a sample high pass filter circuit using op-amp.

Band pass filter :

* A band pass filter is a combination of a high pass and a low pass filter.

* It allows only a select range of frequencies to pass through. Because cut off frequency of the low pass filter is higher than the cut off frequency of the high pass filter

wide Band pass filter :

* It is connection of a low pass filter and a high filter in cascade the f_H of low pass filter and f_L of high pass filter.

Advantages of active filters over passive filters:

* Gain and frequency adjustment flexibility
* No loading problem
* cost Active filters are more economical than passive filter. This is because of the variety of cheaper op-amps and the absence of inductors.

Active Filter types:

* Low pass
* high pass
* Band pass
* wide band pass
* Band Reject.

Low pass filter:

* A low pass filter is used in circuits that only allow low frequencies to pass through.

Amp applications :

A circuit is said to be linear if there exists a linear relationship between its input and the output. similarly a circuit is said to be non linear. If there exists a non linear

op-amps can be used in both linear and non linear applications. The following are the basic application

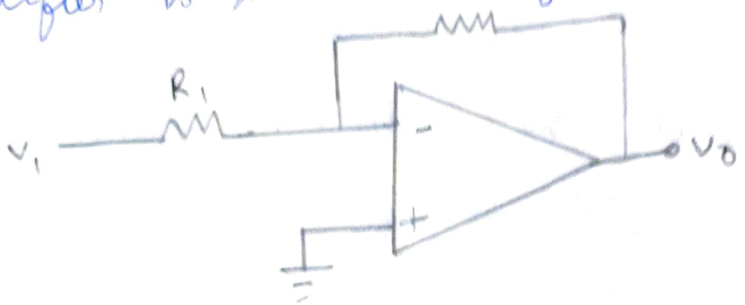
* Inverting amplifies
* Non inverting amplifies
* voltage follower.

this chapter discuses the basic application in details

Inverting amplifier

An inverting amplifier takes the input through its inverting terminal through a resistor R_1. This amplifier not only amplifies the input but also inverts it

The circuit diagram of an inverting amplifier is shown in fig



Note that for an op-amp, the voltage at the inverting input terminal is equal to the voltage at its non inverting input terminal Physically there is no short between those two terminals by virtually they are in shorts with each other

In the circuits the non inverting input terminal is connected to ground that means zero volts is applied at the non-inverting input terminals of the op-amps

According to virtual concept voltage at inverting input terminal of an opamp will be zero volts

The nodal equation at this terminal's node is as shown below

$$\frac{0-V_i}{R_1} + \frac{0-V_o}{R_F} = 0$$

$$\Rightarrow \frac{-V_i}{R_1} = \frac{V_o}{R_F}$$

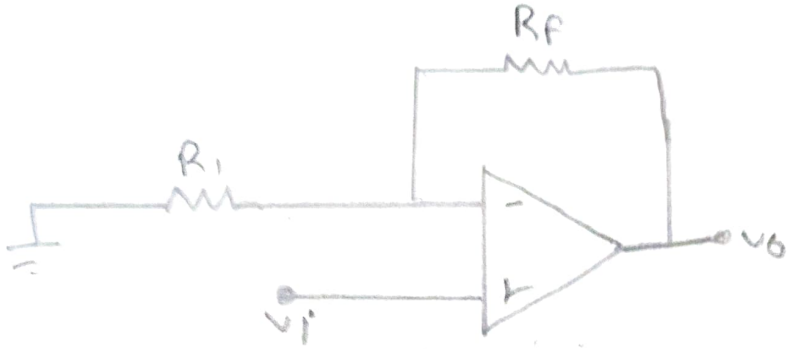
$$\Rightarrow V_o = \left(-\frac{R_F}{R_1}\right) V_i$$

$$\Rightarrow \frac{V_o}{V_i} = -\frac{R_F}{R_1}$$

The ration of the output voltage V_o and the input voltage V_i is the voltage gain or gain of the amplifier, therefore the gain of inverting amplifier is equal to $-\frac{R_F}{R_1}$.

Non Inverting amplifier:

A non inverting amplifier takes the input through its non-inverting terminal, and produces its amplified version as the output.



By using voltage division principle, we can calculate

$$V_1 = V_0 \left(\frac{R_1}{R_1+R_F}\right)$$

virtual short concept :

$$V_1 = V_i$$

$$V_0 \left(\frac{R_1}{R_1+R_F}\right) = V_i$$

$$\frac{V_0}{V_i} = \frac{R_1+R_F}{R_1}$$

$$\frac{V_0}{V_i} = 1 + \frac{R_F}{R_1}$$

Gain of the non inverting amplifies.

$$1 + \frac{R_F}{R_1}$$

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTUR UGE - 2021 B. TECH – ECE

SUMMER 2023 – 2024

List of Slow Learners – Action Taken Report

Course Title: **Linear Integrated Circuits**

Date after Test-1: **23/08/2023**

Academic Year: **2023 - 2024**

Course Code:**10211EC104**

Course Coordinator: **Dr.Vignesh Prasanna N**

Semester: **Summer**

Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

S.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 1	Category
1.		NIL		
2.				
3.				
4.				
5.				

Reason for Low Performance:

1.

Action Planned:

1.

Course Handling Faculty **Course Coordinator** **HOD ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : B		**Course Handling Faculty :** Dr.R.Nanmaran			
1.	VTU22130	VEMIREDDY VENKATA REDDY	4	6	D
2.	VTU23627	SEELAM ROHITH REDDY	9	5	D
3.	VTU21777	HARI TEJA U	7	3	C

Action Taken:

1. Slip tests were conducted.
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were revised once again.

Improvements Observed:

1. The Performance of one student is considerably improved in T2 after writing the retest.
2. One more student scored more than T1 but not a considerable improvement.

Faculty Signature | **Course Coordinator** | **HOD/ECE**

1st Year SEM.: Summer COURSE: LDC

Roll No	Name	Month / Date / Hour							
		7/10	10/10	11/10	14/10	17/10			
		8	8	8	8	8			
21U93130	VENKATESH VEMPATAPU	1	1	1	1	1			
21U93107	CHARAN TEJA REDDY	1	1	1	A	1			
21U91717	HARI TEJA. U	1	1	1	1	1			

Record of Class Activities

S. No.	Date	Topics Covered	Content Delivery Method	Assessment Method	Learning Resources	C.C.M.C. Sign.	HOD Sign.
Ab.	31/10/23	Unit 1, 2, 3 Question bank discussion	Chalk and talk	T3			
47.	04/11/23	Unit 4, 5 Question bank discussion	Chalk and talk	T3			
1.	09/10/23	Characteristics of opamp	Chalk and talk	Slip test			
2.	10/10/23	Opamp Applications	Chalk and Talk				
3.	11/10/23	waveform generators	Chalk and Talk	Slip test			
4.	16/10/23	DAC, ADC, PLL	chalk and Talk				
5.	17/10/23	Slip Test	Chalk and Talk	Slip test			

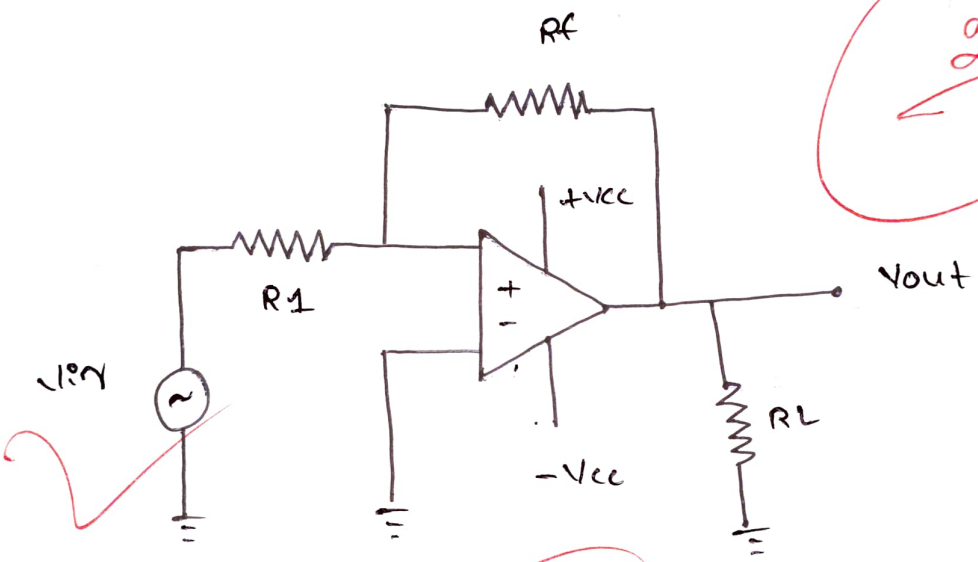
CamScanner

PART - A :-

Slip test

(1) Voltage follower :- An electronic circuit in which the output voltage follows the input voltage is known as a voltage follower. In other words a voltage follower an electronic circuit whose o/p voltage remain same as input voltage

(2)



25/30

R.

TTS3453

opamp Inverting amplifier

Inverting amplifier Using Opamp.

(3) In electronics a Schmitt trigger is a comparator circuit with hysteresis implemented by applying (+) feedback non Inverting Input of a Comparator or diff amplifier. It is an active circuit which converts any analog Input signal to digital o/p signal.

4. A multivibrator is an electronic circuit used to implement a variety simple two state devices flip flop. The first multi vibrator circuit the astable OG multivibrator Oscillator was invented by the Abraham Eugene Bloch during world war 1

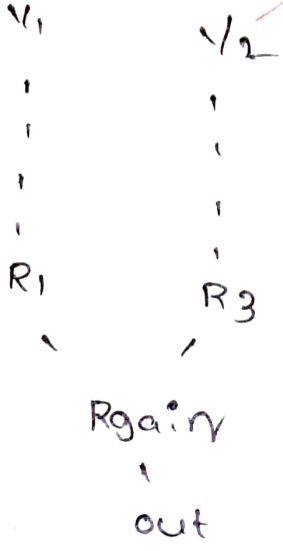
5. Applications :-

* light emitting diode and lamp flashers
* pulse generations
* pulse width modulations
* logic clocks.

PART- B.

6. Instrumentation Amplifier :- It is a specialized OG electronic amplifier circuit commonly used for precise signal amplification. It is designed to amplify the diff b/w two input signals while rejecting common mode noice

Block diagram :-



4. A multivibrator is an electronic circuit used to implement a variety of simple two state devices like flip flop. The first multivibrator circuit the astable OG multivibrator Oscillator was invented by Henri Abraham Eugene Bloch during World War 1

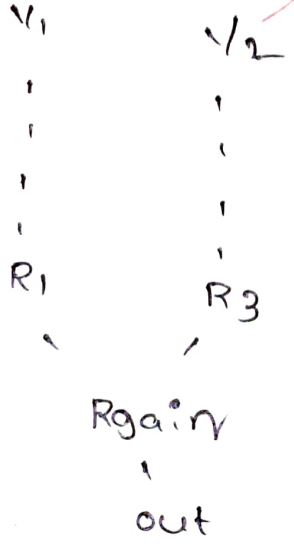
5. Applications :-

* light emitting diode and lamp flashers
* pulse generators
* pulse width modulation
* logic clocks.

PART- B.

6. Instrumentation Amplifier :- It is a specialized OG electronic amplifier circuit commonly used for precise signal amplification. It is designed to amplify the diff b/w two input signals while rejecting common mode noice

Block diagram :-

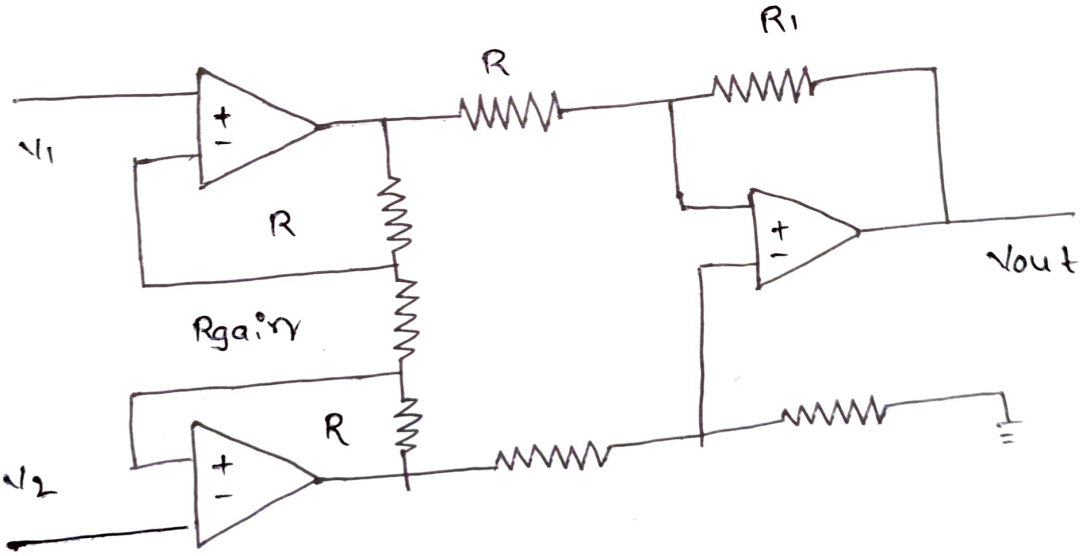


* V_1 and V_2 :- These are input signals and represent the Inverting and non Inverting Inputs.

* R_1 and R_3 :- These are the precision resistor that set the gain of amplifier

* Rgain :- This is Optional amplifier that can be used to fine tune.

* Out :- This is o/p Instrumentation amplifier, provides differential o/p signal



Advantages :-

* Its has ability to reject Common mode signals like noise (or) interface

* Application where you need measure small voltage.

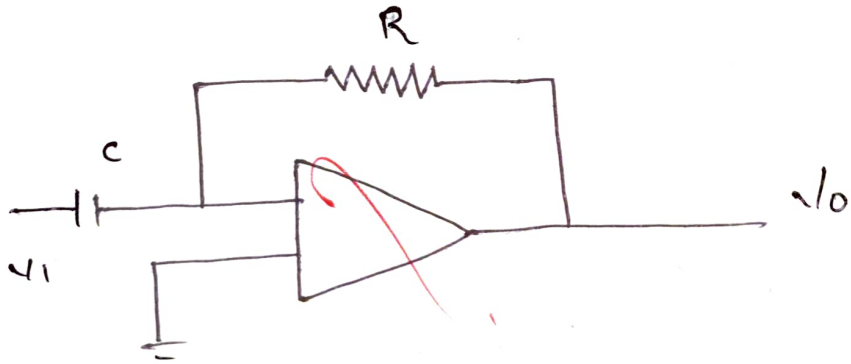
* It has having multipk operational
* It has having additional features like protection and filtering.

7. Differentation and Integrator :-

These are too fundamental electronic circuit used a Signal processing and Central system. They are often Implemented Using Operational amplifier

* Differentiation :-

It is an circuit produces on o/p voltage that is prapotional to rate of change of Input voltage with respect to time



Mathematically :-

$$V_{out} = -R_c * \frac{d(v_{in})}{dt}$$

Where :- V_{in} is i/p voltage

R is resistor.

C is the capacitor

dt is small change in time

These are use as applications where detection rapid a changes occurs

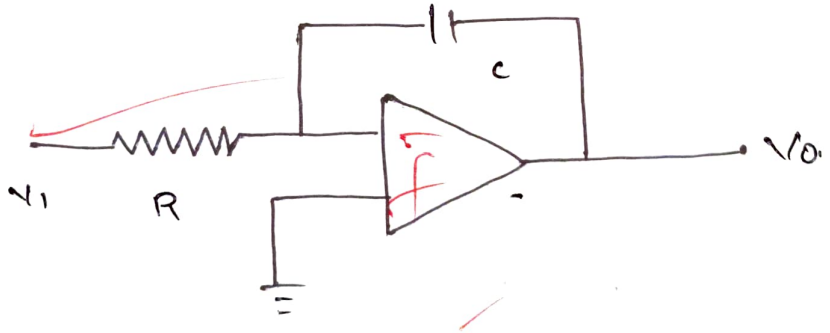
Eg:- pulse shaping, Signal Conditioning

(ii) Integrator :-

It is an circuit produce an o/p voltage that is propotional to Integral of Input voltage with respect to time

Mathematically :-

$$V_{out} = \frac{1}{RC} \int V_{in}.dt$$



where V_{in} is input voltage

R is the resistor value

C is capacitor.

It is used in applications where area under the Input Signal curve needs to measured.

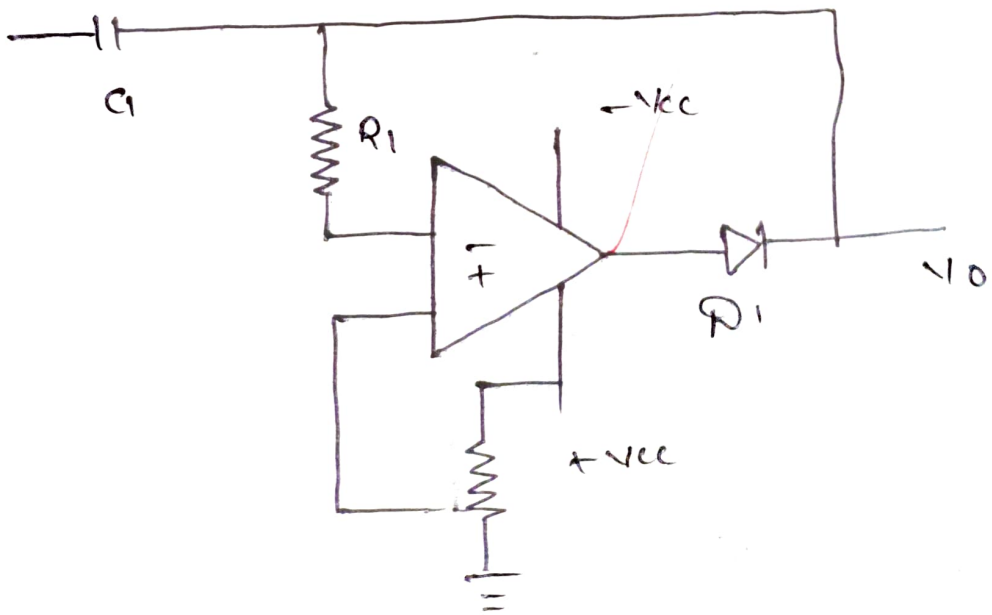
8. clamper :-

A clamper is an electronic circuit that produces an o/p, which similar i/p shift in Dc level. In other word the o/p of a clamper an exact replace of Input. Hence peak amplitude o/p clamper will be always equal to the input.

Clamper are used to Introduce restore Dc level of Input signal o/p. There are two types

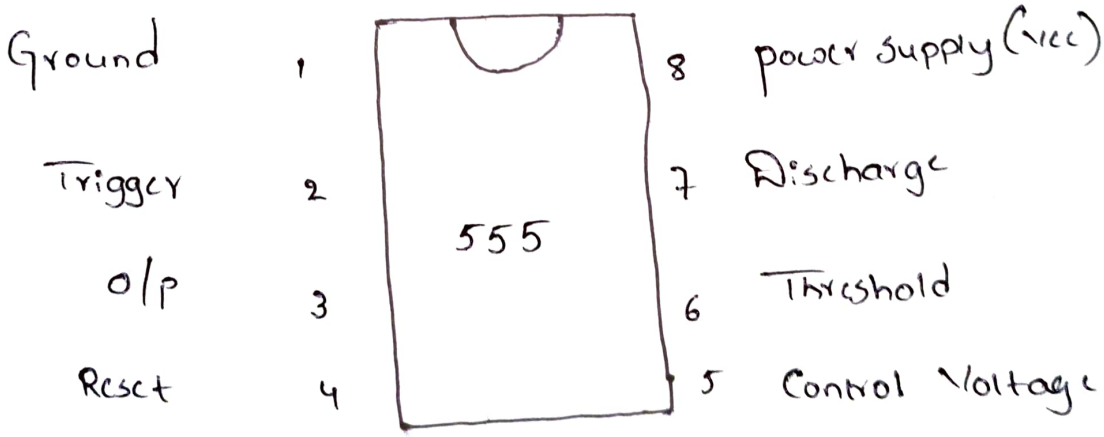
* positive clamper
* Negative clamper

A positive clamper clamper circuit produces o/p is such a way input signal shifted Vertically by a positive Dc value.



In above circuit Sinusoidal voltage Signal V_i is applied terminal of Op-amp through a network consists of a Capacitor C_1 and resistor R_1. That means Ac voltage Signal applied to Inverting terminal of Op-amp.

The Dc reference Voltage V_{ref} applied non-Inverting terminal of Op-amp The Value reference Voltage V_{ref} chosery Varying resistor R_2. In Case reference Voltage. V_{ref} of positive Value.



The 555 timer IC (Integrated circuit) has 3 terminal functional blocks.

* Voltage Divider: The 555 timer has an Internal Voltage divider network Composed 3 resistor. This

Two third (2/3) and One third (1/3) Vcc which are Important reference Voltage for timers Operation

Comparator: The 555 timer two Voltage Comparators denoted Trigger Threshold Comparator. These Comparator Compare Voltage levels at threshold input Internal reference Voltage Trigger Voltage falls below Trigger reference, the Trigger Internal flip flop threshold Voltage exceeds the reference Threshold Comparator resets flip flops

Flip flop:- The 555 timer Contains SR (set Reset) flip Control o/p state. When flip flop, o/p high state when it reset o/p low state. The flip flop by the Trigger threshold Comparator explained above

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC110/DataCommunication Networks

Course Coordinator : Dr .D.DAVID NEELS PONKUMAR

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : A		**Course Handling Faculty :**Mr.A.Farithkhan		
1.	VTU22990	NIMMAKAYALA KARTHEEK KUMAR REDDY	C	4
2.	VTU23026	GURRAM VIJAY PRATYUSH REDDY	C	2
3.	VTU23240	SOMA SURENDRA BABU	C	AB
4.	VTU23294	KONATHAM RAMI REDDY	C	AB
5.	VTU23300	MADAMANCHI ANJALI	C	AB
6.	VTU23422	ANURAJULA RANGA RAKESH	C	AB
7.	VTU23461	BANKA GOPI	C	0
8.	VTU23785	AKULA SAI	C	AB
9.	VTU23837	BATTULA HEMANTH KUMAR	C	AB
10.	VTU24266	AKSHAYA PRASAD R	C	AB

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Students are late registration.

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

SLOW LEANERS

CLASS: DCN(1502) SEM.: III odd sem COURSE: DCN

	Roll No	Name	Month	AUG		SEPT		OCT				Seminar	
			Date	26	8	9	9	30	9	14	10	OCT	
			Hour	7	8	7	8	7	8	7	8	27	10
1	21515	VINAY KUMAR		1	2	A	A	3	4	A	A	7	8
2	21686	INDRANEEL		A	A	A	A	A	A	A	A	A	A
3	23566	GURU MANOHAR		A	A	1	2	3	4	5	6	A	A
4	23790	HEMASUNDAR		1	2	A	A	3	4	5	6	7	8
5												7	8
6													
7													
8													
9													
10													
11													
12													
13		Topics Taken											
14	26/8	Line coding Techniques											
15	26/8	OSI and TCP/IP Model											
16	9/9	Error Detection and correction Techniques											
17	9/9	ARQ protocols											
18	30/9	Link state routing											
19	30/9	Distance vector Routing											
20	14/10	HTTP, FTP, SMTP											
21	14/10	Markov chain theory and											
22		queuing models											
23	28/10	Advanced switching Techniques											
24	28/10	Software defined Networks											
25													
26													
27													
	No. of Absentees			2	2	3	3	1	1	2	2	2	2
	Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

130

TCP

* TCP - Transmission control protocol. Transport Layer protocol that facilites the transmition of packets from source destination
* connection - oriented protocal - Establishes the connection prior to communication that occurs between the computing devices in a network
* This protocol is used with ip protocol are refered to as a TCP/IP
* The main fucionality of the TCP is to take the data from the application

TCP Features

* Transport Later protocol
* Reliable
* Order of data is created
* Connection - oriented
* Full duplex
* stream oriented

Need for TCP

* Layered architeture of a network model, the whole task is divided into smaller tasks
* Each task is assigned to a particular Layer that process the task

Working of TCP

* Connection is established by using three-way handshaking
- The client sends segment with its sequence
- when the client receives the acknowledgment of it's segment, then it sends the acknowledgment to the server

TCP Head format

Source port :- The port of the application which is sending the data.

Destination port :- The port of application on the receiving side

Sequence number :- The sequence number of data bytes in particular session

HLEN :- The length of the header indicated by the 4-byte words in the header

Reserved :- It is a 4-bit field reserved for future use, and by default, all are set to zero

CP Header format

Window size :- 16- bit field - the size of the data that the receiver can accept this field is used for flow control between the sender and reciver and also determins the amount of buffer allocated by the Reciver

checksum :- 16-bit field - optional in UDP, but in TCP/IP - This field is mandatory

options :- provides additional option (32-bits) in field

Advantages of TCP

- connection - oriented reliable service - guarantes the delivery of data packets. If the data packet is lost across the network.
- Flow control mechanism using a sliding window
- Error detection by using checksum and Error control by using Go Back or ARP protocol

Limitations of TCP

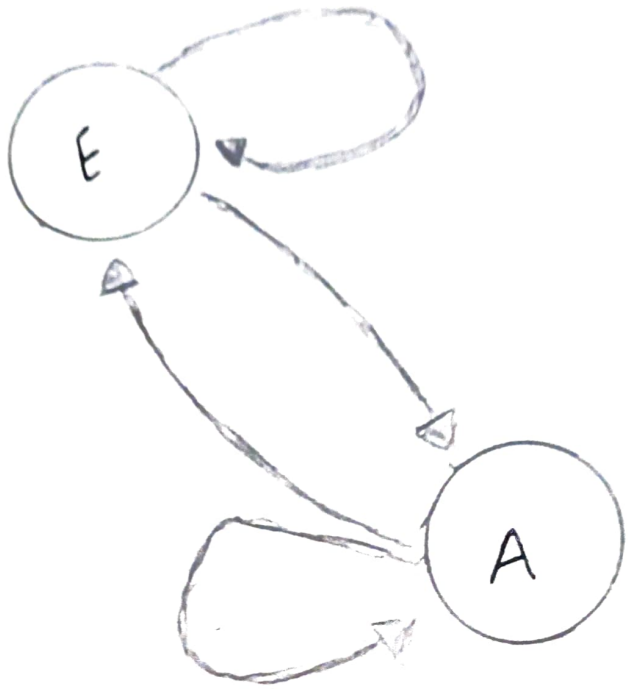
- Increases a large amount of overhead as each segment gets it's own TCP header - Fragmentation by the router increases the Overhead

Markov process

A markov process, also known as markov chain, is a mathematical system that undergoes transitions from one state to another in a way that is described by specific set of probabilities. These transitions depends only on the current state and memoryless, meaning that the future behaviour of the system is independent of its past states.

markov processes are used in various fields including physics, economics and computer science, to model system that exhibit probalistic behaviour and can be described by a sequence of states and transition probabilities.

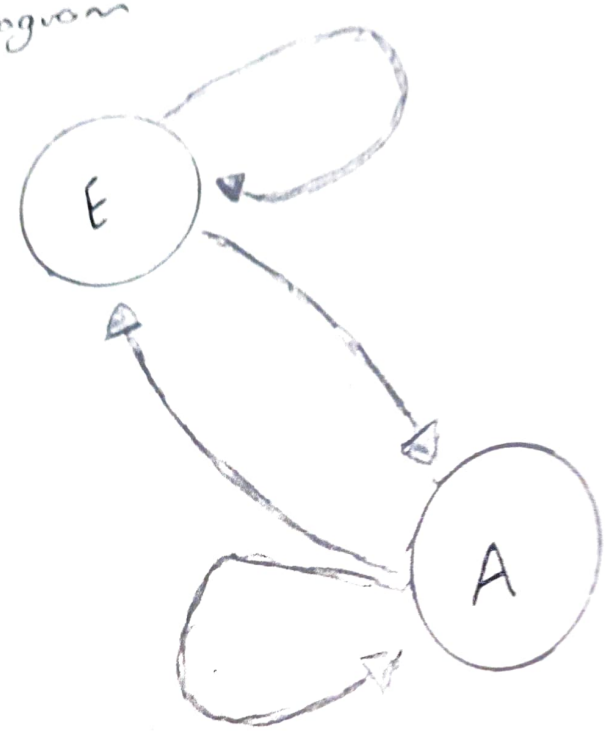
Let us explain the markov chain with the help of a diagram



A Diagram Representing a two - state (states, and A) markov process. Here the arrows originated from the current state and point to the future state and the numbers associated with the arrows indicates the probability of the markov process chaing from one state to the another state

Let us explain a markov chain

help of a diagram



A diagram Representing a two - state (states E and A) markov process. Here the arrows originated from the current state and point to the state and the numbers associated with the arrows indicates the probability of the process chaing from one state to another state

They are essential for understanding and simulating dynamic systems with the uncertainty

If you have specific questions about the markov processes, please feel free to ask.

4/5

28/10

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VTRUGE2021B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC110/Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : B		**Course Handling Faculty :Dr.D.David Neels Ponkumar**		
1.	VTU21951	JANGAM LOKESH	C	6
2.	VTU23627	SEELAM ROHITH REDDY	C	7
3.	VTU22711	KORRAPATI MANIDEEP	C	12

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero)

Reason for Low Performance:

- Not Presented the concepts and Problems properly

Action Planned:

- To conduct Special class on every Tuesday till University Exams
- To handle Previous Year University Papers about how to present the answers in exam

Faculty **Course Coordinator** **HOD Sign**

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WINTER 2021-2022

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC110/Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in ...		
			Test II	TESTIII	End Semester Result
Section : B		Course Handling Faculty :Dr.D.David Neels Ponkumar			
1.	VTU21951	JANGAM LOKESH	16	14	
2.	VTU23627	SEELAM ROHITH REDDY	16	21	
3.	VTU22711	KORRAPATI MANIDEEP	15	24	

Action Taken:

- **Taught important topics**

Improvements Observed:

- **Two students have passed test 2**

Faculty

Course Coordinator

HOD Sign

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC110/ Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : B		**Course Handling Faculty :** Dr.K.Aanandha Saravanan		
1.	21515	KOTIPALLI PONY VINAY KUMAR	C	AB
2.	21686	KANALA INDRANEEL	C	0
3.	23566	POLIBOINA GURU MANOHAR	C	8
4.	23790	ANNAM HEMASUNDAR	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- They are irregular to the class.
- Late registration
- Lack of preparation by students.

Action Planned:

- Extra classes will be conducted to explain the concepts
- Slip test

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC110/ Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : B		**Course Handling Faculty :** Dr.K.Aanandha Saravanan			
1.	21515	KOTIPALLI PONY VINAY KUMAR	6	5	RA
2.	21686	KANALA INDRANEEL	2	AB	NE
3.	23566	POLIBOINA GURU MANOHAR	0	16	RA
4.	23790	ANNAM HEMASUNDAR	6	15	D

Action Taken:

- Extra Class were taken
- Slip test given

Improvements Observed:

- Two students have improved

Faculty

Course Coordinator

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC110 & Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : C		**Course Handling Faculty :** Dr.Helina Rajini Suresh		
1.	VTU21366	BITTU KUMAR	C	11
2.	VTU21673	VANIPENTA CHANDRA REDDY	C	AB
3.	VTU22143	RAMIREDDY MUKESH REDDY	C	4
4.	VTU22317	AMANJEET SINGH	C	10
5.	VTU22375	K RAGHUL	C	AB
6.	VTU23612	PENGONDA VENKATA ROHITH KUMAR	C	AB
7.	VTU23772	YELLA MARK SNEHITH	C	AB (Late Registration)

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- They are irregular to the class.
- Lack of preparation by students.

Action Planned:

- Planned to conduct Special class for the students
- Planned to conduct slip test

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC110 & Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : S3		**Course Handling Faculty :** Dr.Helina Rajini Suresh			
1.	VTU21366	BITTU KUMAR	AB	AB	Not Eligible
2.	VTU21673	VANIPENTA CHANDRA REDDY	2	8	D
3.	VTU22143	RAMIREDDY MUKESH REDDY	AB	3	RA
4.	VTU22317	AMANJEET SINGH	15	8	D
5.	VTU22375	K RAGHUL	AB	3	RA
6.	VTU23612	PENGONDA VENKATA ROHITH KUMAR	AB	AB	Not Eligible
7.	VTU23772	YELLA MARK SNEHITH	AB	AB	Not Eligible

Action Taken:

- Slip test conducted

Improvements Observed:

- The performance of VTU22317 has improved in Test II.
- VTU21673, VTU22317 and VTU22375 have got 15,15 and 21 respectively in Test I retest.
- But VTU21366, VTU23612 and VTU23772 are irregular to classes and hence are not eligible for End Semester exams.

Faculty **Course Coordinator** **HOD Sign**

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SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : E		**Course Handling Faculty :** Dr. Dasari Naga Vinod		
1.	VTU21912	GURRAM LOKESH	C	6
2.	VTU23724	REDDY SUNIL YAKKANTI	C	2
3.	VTU22130	VEMIREDDY VENKATA REDDY	C	6
4.	VTU23609	TAMMISETTI DHANAMURTHY	C	10

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- They are irregular to the classes.
- Few students done late Registration.
- Lack of preparation by students.

Action Planned:

- Extra Coaching

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : E		**Course Handling Faculty :** Dr. Dasari Naga Vinod			
1.	VTU21912	GURRAM LOKESH	15	16	D
2.	VTU23724	REDDY SUNIL YAKKANTI	A	0	NE
3.	VTU22130	VEMIREDDY VENKATA REDDY	11	7	D
4.	VTU23609	TAMMISETTI DHANAMURTHY	6	10	RA

Action Taken:

1. Extra Coaching.
2. Extra classes were conducted for slow learners.
3. Conducted Retest.

Improvements Observed:

Only one student got better marks in Test -II compared to Test -I. Remaining students motivated them to study well.

Faculty

Course Coordinator

HOD Sign

SLOW LEARNER'S List

CLASS 1621 / E Sec SEM SUM COURSE DCN

Roll No	Name	Month	Sept'23			Oct'23				
		Date	9	9	9	14	14	14	17	17
VTU		Hour	3	4	7	3	4	7	6	7
21912	GURRAM LOKESH		1	A	2	3	4	5	A	6
23724	REDDY SUNIL YAKKANTI		1	2	3	A	A	4	5	6
22130	V.VENKATA REDDY		1	A	2	3	4	5	A	6
23609	TAMMISETTI DHANAMURTHY		A	1	2	A	3	4	5	A
No. of Absentees			1	2	0	2	1	0	2	1
Initials										

RECORD OF CLASS WORK

Class: 1621 | E Sec Semester: SUM Course: DCN

S. No.	Date	Topics covered	No. of periods	Initials		
				Faculty	CC/MC	H.O.D
1.	9/9/23	UNIT-1: N/W Topologies ISO/OSI Reference Model	03			
2.	14/10/23	UNIT-2: Types of Errors, Single bit Error, Hamming Code UNIT-3: Circuit Switching Packet Switching	03			
3.	17/10/23	UNIT-4: Congestion Control, SMTP N/W Security UNIT-5: Markov Chain Theory, Queuing Model, SDN	02			

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List of Slow Learners – Action Planned & Action Taken Report

Date after T I:17.08.2023

Course Title : Data Communication Networks
Course Code : 10211EC110
Semester : Summer
Course Coordinator: Dr. D. David Neels Ponkumar

Academic Year :2023-2024

S.No	VTU No.	Name of the Student	Category	Performance in T- 1 CIA
Slot : S6		Course Handling Faculty : Dr. Mariya Celin TA		
NIL				

Criteria : Category C and Failures & Absentees for Test-I (considering Absent as Zero)

Reason for Low Performance:

NA

Action Planned:

NA

Action Taken:

NA

Course Coordinator

HOD Sign

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List of Slow Learners – Action Planned Report

Date after T I:17.08.2023

Course Title : Data Communication Networks
Course Code : 10211EC110
Semester : Summer
Academic Year :2023-2024
Course Coordinator: Dr. D. David Neels Ponkumar

S.No	VTU No.	Name of the Student	Category	Performance in T- 1 CIA
Slot : S7		**Course Handling Faculty : Dr. NALINI.N**		
1	VTU21553	SANNAPA REDDY GANESH	C	4
2	VTU23352	KESU GURU PRASAD	C	AB
3.	VTU23676	GEDALA SHANKAR BHAGAVAN	C	AB

Criteria : Category C and Failures & Absentees for Test-I (considering Absent as Zero)

Reason for Low Performance:

Irregular to class

Action Planned:

Informed his mentor and has asked him to be regular to class and planned extra classes for him. Planned to conduct Slip Test every week during special class on important topics discussed in that week.

Course Coordinator

HOD Sign

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List of Slow Learners – Action Planned Report

Date after T I:17.08.2023

Course Title : Data Communication Networks
Course Code : 10211EC110
Semester : Summer
Course Coordinator: Dr. D. David Neels Ponkumar

Academic Year :2023-2024

S.No	VTU No.	Name of the Student	Category	Performance in T- 1 CIA
Slot : S8		Course Handling Faculty : Dr. Vaishnavi T		
1	VTU23319	PRIYADHARSHINI R	B	0

Criteria : Category C and Failures & Absentees for Test-I (considering Absent as Zero)

Reason for Low Performance:

Irregular to class

Action Planned:

Informed her mentor and has asked her to be regular to class and planned extra classes for her. Planned to conduct Test every week during special class on important topics discussed in that week.

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :1021EC110/ Data Communication and Networks

Course Coordinator : Dr.David Neel Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : S9		**Course Handling Faculty :**Ms.C Ambika Bhuvaneswari		
1.	VTU21738	MOGILISETTY VIVEKANANDA	C	AB
2.	VTU22045	NANDIMANDALAM SAI SIVA	C	3
3.	VTU22525	KOLLALA MOHAN KRISHNA	C	AB
4.	VTU23607	SHAIK FAREED BAIG	C	AB
5.	VTU23703	SHAIK YAKUB PASHA	C	AB

Criteria for slow learners: Category 'C' &Failures inTEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Students were not attending the classes regularly. Informed their Mentors regarding the attendance percentage.

Action Planned:

Question Bank was prepared with 2 marks and 5 marks with answers. Students will be informed to maintain separate notebook to study and write big questions. Planned to conduct special classes and slip tests.

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 Discrete Time Signal Processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr S Jana		
1.	VTU19508	PASUPULETI AKSHAY KUMAR	C	AB
2.	VTU19689	A S ROHITH REDDY	C	12
3.	VTU19846	CHINTHALAPUDI NAGA KARTHIK BABU	C	2.5
4.	VTU19959	MANEPALLI VENKATA SAI KRISHNA	C	2
5.	VTU20302	NIDADAVOLU VENKATA BHANU CHANDRADEEP	C	AB
6.	VTU20904	ERIGELA MALLIKARJUNA REDDY	C	7.5
7.	VTU20993	THADIKAMALLA ADITYA	C	0
8.	VTU21115	JERVISH E	C	1.5
9.	VTU21206	EPURI SAI KIRAN	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty

Course Coordinator

HOD Sign

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DEPARTMENT OF ECE

VTR UGE 2021

Slow Learner's Remedial Class Time Table

Course Title: Discrete Time Signal Processing
Course Handling Faculty: Dr. S Jana (Section – A)
Course Coordinator : Dr. S. Jana

Course Code: 10211EC111
Academic Year: 2023 – 2024
Semester: Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday									
Wednesday									
Thursday				SL Class					
Friday									
Saturday									

SL – Slow Learner's Class

Faculty In-Charge

Course coordinator

HOD/ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
WINTER 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 Discrete Time Signal Processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : A		Course Handling Faculty : Dr S Jana			
1.	VTU19508	PASUPULETI AKSHAY KUMAR	7.5	13	C
2.	VTU19689	A S ROHITH REDDY	8.5	15	D
3.	VTU19846	CHINTHALAPUDI NAGA KARTHIK BABU	9	15	D
4.	VTU19959	MANEPALLI VENKATA SAI KRISHNA	3	10	C
5.	VTU20302	NIDADAVOLU VENKATA BHANU CHANDRADEEP	0	9	RA
6.	VTU20904	ERIGELA MALLIKARJUNA REDDY	13	17	C
7.	VTU20993	THADIKAMALLA ADITYA	0	0	NE
8.	VTU21115	JERVISH E	2	6.5	RA
9.	VTU21206	EPURI SAI KIRAN	2	8	RA

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed:
Two students showed improvement in test 2 and test 3
Out of 8 students 5 students passed in End Sem Exam.

Faculty

Course Coordinator

HOD Sign

SEC A SEM 9523 24 COURSE DTSP

		Month	Aug 23	Sep 23		Oct 23		
		Date	24	14	21	5	12	26
		Hour	4	4	4	4	4	
19508	Pisupuleti Akshay kumar		/	/	/	/		
19689	A S Rohith Reddy		/	/	A	/	/	
19846	Chinthlapudi Naga Karthik Babu		/	/	/	/	/	A
19959	Manepalli Venkata Sai Krishna		/	/	/	/	/	
20302	Midadavolu Venkata Bhanu Chandradeep		/	/	A	/		
20304	Erigela Mallikarjuna Reddy		/	/	/	/	/	A
20993	Thadikamala aditya		A	/	A	/	/	
21115	Jeevsh E		/	/	/	/	A	/
21206	Epuru Sai kiran		/	/	A	/	/	

Topics Revised

24/8/23 Decimation in Time and Decimation in Frequency

14/9/23 Butterworth and Chebyshev filter design

21/9/23 Realization of structures

5/10/23 Windowing technique of FIR design

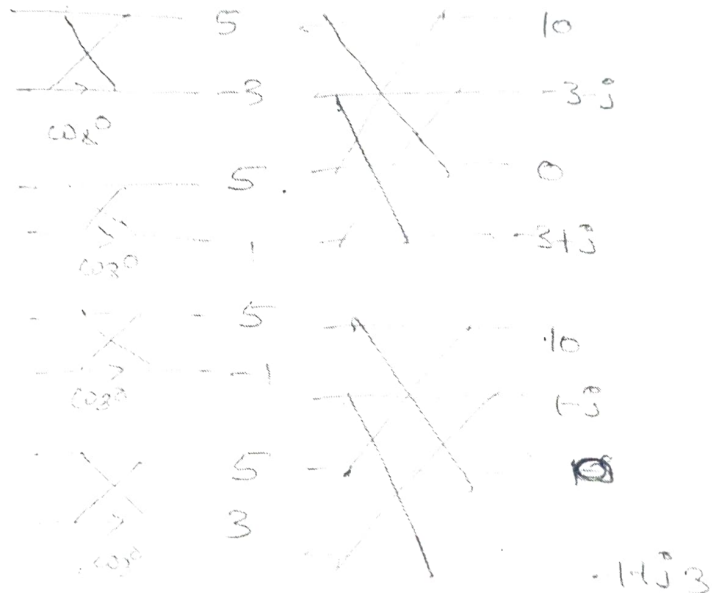
12/10/23 Frequency sampling Technique

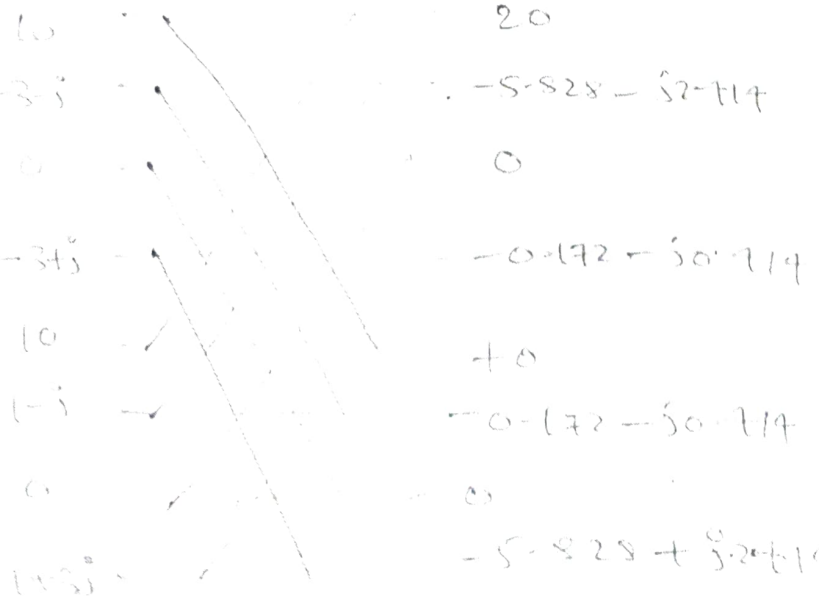
26/10/23 Important Questions discussion - unit 4 & units

P. Akshay Kumar
VTU19508

Unit-I

DFT of following sequence





2) Circular Convolution $x(n) = \{1, -1, -2, 3, -1\}$

$x(n) = \{1, 2, 3\}$

$x_1(n) = \{1, -1, -2, 3, -1\}$

$x_2(n) = \{1, 2, 3, 0, 0\}$

$$y(n) = \begin{bmatrix} 1 & -1 & 3 & -2 & -1 \\ -1 & 1 & -1 & 3 & -2 \\ -2 & -1 & 1 & -1 & 3 \\ 3 & -2 & -1 & 1 & -1 \\ -1 & 3 & -2 & -1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 8 \\ -2 \\ -1 \\ 4 \\ -1 \end{bmatrix}$$

Unit - II

1) $\alpha_p = 20dB$ $\Omega_p = 20 rad/sec$

$\alpha_s = 10dB$ $\Omega = 30 rad/s$

Order of filter

$$N \geq \frac{\log \sqrt{\frac{10^{0.1\times 5}-1}{10^{0.1\times 2}-1}}}{\log \frac{\Omega_s}{\Omega_p}}$$

$$\geq \frac{\log \sqrt{\frac{10^{0.1\times 10}-1}{10^{0.1\times 2}-1}}}{\log 30/20} \qquad \frac{\log \sqrt{\frac{10^{0.1}}{10^{0.2}-1}}}{\log 30/20}$$

$N \geq 3.37$

$\boxed{N = 4}$

$H(s) = \frac{1}{\quad}$

$(10^{0.4}P_1)^{1/2N}$ $(10^{0.2}-1)^{1/8}$

$$H(s) = \frac{1}{\left(\left(\frac{s}{21.3868}\right)^2 + 0.7693\frac{s}{21.3868} + 1\right)\left(\left(\frac{s}{21.3868}\right)^2 + 1.8411\frac{s}{21.3868} + 5.5\right)}$$

$$H(s) = \frac{0.2092 \times 10^2}{(s^2 + 16.3868s + 45.7354)(s^2 + 39.5765s + 45.7394)}$$

2) Design chebyshev analog low pass filter transfer function for the given specifications $\alpha_P = 3dB$ $f_P = 1KHz$, $\alpha_S = 16dB$ and $f_S = 2KHz$

A) Given

$\alpha_P = 3dB$ $\alpha_S = 16dB$

$f_P = KHz$ $f_S = 2Hz$

$\Omega_P = 1000 \times 2\pi$ $\Omega_S = 2000 \times 2\pi$

$= 2000\pi$ rad/sec $= 1000\pi$ rad/sec

$$N \geq \frac{\cosh^{-1}\left(\sqrt{\frac{10^{0.4}\alpha_S - 1}{10^{0.4}\alpha_P - 1}}\right)}{\cosh^{-1}(\Omega_S/\Omega_P)} \geq \frac{\cosh^{-1}\left(\sqrt{\frac{10^{0.4}\alpha_S - 1}{10^{0.4}\alpha_P - 1}}\right)}{\cosh^{-1}(4000\pi/2000\pi)}$$

$N \geq 1.9$

$N \geq 2$

$(10^{0.4}P_1)^{1/2} = (10^{0.3(3)} - 1)^{1/2} = (10^{0.3} - 1)^{1/2} = 1$

$\sqrt{1+\varepsilon^2} = (1) + \sqrt{1+0.3^2} + 1 + \sqrt{2} = 2.4$

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DEPARTMENT OF ECE

VTR UGE – 2021 B.TECH-ECE

SUMMER 2023-24

List of Slow Learners – Action Planned Report

Faculty Name : Dr.Arun.C.A

Course Title & Course Code : Discrete Time Signal Processing & 10211EC111 **TTS Number**: 2913

Semester : Summer Semester

Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : B		Course Handling Faculty :Dr.Arun.C.A		
1	VTU24066	DASAMANENI GAURAV	C	6
2	VTU20647	VENNAPUSA SIVA REDDY	C	3
3	VTU21253	SAMMUTURU VISHWANATH	C	2
4	VTU21017	CHINTALA RAVI TEJA	C	1
5	VTU20881	PILLI PAVAN SRINIVAS	C	0
6	VTU20844	DASARI SHANMUK SHANDAN	C	0
7	VTU20831	PAMULAPATI RAVI TEJA	C	8

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Give class test for practice

Give revision after syllabus completion

C.A

Faculty Signature

Course Coordinator

HOD Signature

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learner's Remedial Class Time Table

Course Title: Discrete Time Signal Processing
Course Code: 10211EC111
Course Handling Faculty: Dr. Arun.C.A (Section – B)
Academic Year: 2023 – 2024
Course Coordinator : Dr. S. Jana
Semester: Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday									
Wednesday									
Thursday									
Friday			SL Class	SL Class					
Saturday						SL Class			

SL – Slow Learner's Class

C.A.
Faculty In-Charge

Course coordinator

HOD/ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE – 2021 B.TECH-ECE

SUMMER 2023-24

List of Slow Learners – Action Taken Report

Faculty Name : Dr.Arun.C.A **TTS Number**: 2913
Course Title & Course Code : Discrete Time Signal Processing & 10211EC111
Semester : Summer Semester
Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : B		Course Handling Faculty : Dr Arun.C.A			
1.	VTU24066	DASAMANENI GAURAV	AB	AB	D
2.	VTU20647	VENNAPUSA SIVA REDDY	AB	AB	NE
3.	VTU21253	SAMMUTURU VISHWANATH	04	17	D
4.	VTU21017	CHINTALA RAVI TEJA	00	02	RA
5.	VTU20881	PILLI PAVAN SRINIVAS	AB	AB	NE
6.	VTU20844	DASARI SHANMUK SHANDAN	AB	AB	NE
7.	VTU20831	PAMULAPATI RAVI TEJA	AB	AB	NE

Action Planned:

Gave important questions through question bank
Conducted special class for important topics

Improvement:

One student got pass mark in Test-3
Two students passed in end semester exam

C.A.
Faculty Signature

Course Coordinator

HOD Signature

SLOW LEARNERS

CLASS: SEC - B SEM.: SS 23-24 COURSE: DTSP

		Month								
		Date								
		Hour								
	D. GAURAV		/	/	/	/	/	/	/	/
24066	V. SIVA REDDY		/	/	A	A	A	A	/	/
20847	S. VISWANATH		/	/	/	/	/	/	/	/
21053	C. RAVI TEJA		/	/	/	/	/	/	/	/
21057	P. P. SRINIVAS		A	A	A	A	A	A	A	A
20881	D. SHANMUK SHANDAN		A	A	A	A	A	A	A	A
20844	P. RAVI TEJA		A	A	A	A	A	A	A	A
20831										

TOPICS DISCUSSED

1. Decimation In Time
2. Decimation In Freqeuncy
3. Overlap add method
4. Overlap save method
5. Impulse invariance
6. Bilinear Transformation

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : K		**Course Handling Faculty :** Ms.Subha K J		
1.	VTU19534	UTCHURU DEEPAK	C	2
2.	VTU19178	KASIREDDY HARI KISHAN REDDY	C	7
3.	VTU19569	KATHERA PALLI SUBHASH CHANDRA BOSE REDDY	C	2.5
4.	VTU20624	YEDDULA AKHIL	C	3.5
5.	VTU20868	KORIVI PURNA VAMSI	C	9
6.	VTU20891	PEDDAPOTHULA VENKATA HEMANTH	C	0
7.	VTU20965	SHAIK K KAIF	C	8
8.	VTU21025	DEVAPURE RAHUL	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Few students are irregular to the class
2. Not focusing normally.
3. Lack of preparation for solving problem

Action Planned:

1. Planned to give more practice on tutorial problems
2. Special classes planned to conduct.
3. Planned to conduct slip test.

Faculty Signature **Course Coordinator** **HoD/ ECE**

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DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : Discrete Time Signl Processing
Course Handling Faculty: Ms. Subha K J
Course Coordinator : Dr. S. Jana

Course Code:1021IEC111
Academic Year: 2023 – 2024
Semester : Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday									
Wednesday				SL (Sec – K)					
Thursday									
Friday									
Saturday									

SL – Slow Learner's Class

Faculty

Course Coordinator

HOD ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 & Discrte Time Signal Processing

Course Coordinator : Dr.S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : K		**Course Handling Faculty :**Ms.SUBHA K J			
1.	VTU19534	UTCHURU DEEPAK	0	8.5	D
2.	VTU19178	KASIREDDY HARI KISHAN REDDY	3	7	RA
3.	VTU19569	KATHERA PALLI SUBHASH CHANDRA BOSE REDDY	0	4	RA
4.	VTU20624	YEDDULA AKHIL	0	0	D
5.	VTU20868	KORIVI PURNA VAMSI	6.5	15	D
6.	VTU20891	PEDDAPOTHULA VENKATA HEMANTH	0	0	RA
7.	VTU20965	SHAIK K KAIF	0	9	D
8.	VTU21025	DEVAPURE RAHUL	0	5	D

Action Taken:

1. Slip tests/Quiz were conducted.
2. Text books and materials were shared
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were discussed.

Improvements Observed:

1. The Performance of few students were improved in T2 and T3 compared to T1

Faculty Signature **Course Coordinator** **HOD/ECE**

CLASS: III - ECE SEM.: V COURSE: 10211EC111

SLOW LEARNERS

S.NO	H.T.NO	NAME	Month	AUGUST				SEP	
			Date	16	23	30	13	20	27
			Hour	04	04	04	04	04	04
1	19534	U DEEPAK		1	2	3	4	5	6
2	19175	K HARI KISHAN REDDY		1	2	3	4	a	5
3	19569	K SUBHASH CHANDRA BOSE REDDY		1	2	3	4	5	6
4	20624	Y AKHIL		1	2	3	4	5	6
5	20865	K PURNA VAMSI		1	2	a	3	4	5
6	20891	P V HEMANTH		1	2	3	4	5	6
7	20965	SHAIK K KAIF		1	2	a	a	a	3
8	21025	D RAHUL		1	2	a	a	a	a
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
				3	2	3	1		

Seminar

OCT	NOV
18	01
04	04
9	10
8	9
9	10
9	10
8	9
a	8
6	7
5	6
1	

M D H

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

RECORD OF CLASS WORK

II - ECE | Semester: V | Course: 10211EC111

Date	Topics covered	No. of periods	Initials		
			Faculty	CC/MC	H.O.D
	SLOW LEARNERS · TOPICS COVERED				
16.08.2023	DIT-FFT, DIF-FFT Algms	01			
23.08.2023	Circular convolution	01			
30.08.2023	Butterworth filter	01			
13.09.2023	Structures of IIR filter	01			
20.09.2023	Filter design using windowtech	01			
27.09.2023	Freq. Sampling Technique	01			
04.10.2023	Coefficient Quantn error	01			
11.10.2023	Product Quantn error	01			
18.10.2023	Decimation, Interpolation	01			
01.11.2023	Sub band coding	01			

the circular convolution of two finate sequence

$x_1(n) = \{1, -1, -2, 3, -1\}$

$x_2(n) = \{1, 2, 3\}$ (8) (b)

V to 20986
K. venkat
DISP SLIP Test

Sol

In circular convolution

No of samples should be same

$x_2(n) = \{1, 2, 3, 0, 0\}$

Now To rotate 2nd sequence only

$[x_2(n)]\ [x_1(n)] = [y(n)]$

2nd seq 1st seq

Rotate

$x_2(n)$

$$\begin{bmatrix} 1 & 0 & 0 & 3 & 2 \\ 2 & 1 & 0 & 0 & 3 \\ 3 & 2 & 1 & 0 & 0 \\ 0 & 3 & 2 & 1 & 0 \\ 0 & 0 & 3 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ -2 \\ 3 \\ -1 \end{bmatrix} =$$

the o/p $y(n)$ of filter whose impulse $h(n) = \{1, 2\}$ and input signal $x(n) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap add method.

VTU20486

Sol Given $L = 12$

$N = 2$

$N-1$ zeroes • append to the given $x(n)$

$x(0) = \{1, 2, 0\}$

$x(1) = \{-1, 2, 0\}$

$x(2) = \{3, -2, 0\}$

$x(3) = \{-3, -1, 0\}$

$x(4) = \{1, 1, 0\}$

$x(5) = \{2, 1, 0\}$

$x(6) = \{1, 2, 0\}$

By Matrix Method

$$y(0) = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ 0 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} =$$

$$\begin{bmatrix} 1 \\ 4 \\ 4 \end{bmatrix}$$

$$y(1) = \begin{bmatrix} -1 & 0 & 2 \\ 2 & -1 & 0 \\ 0 & 2 & -1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \end{bmatrix}$$

$$y(2) = \begin{bmatrix} 3 & 0 & -2 \\ -2 & 3 & 0 \\ 0 & -2 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \\ -4 \end{bmatrix}$$

$$y(3) = \begin{bmatrix} -3 & 0 & -1 \\ -1 & -3 & -3 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} -3 \\ -7 \\ -2 \end{bmatrix}$$

$$y(4) = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$$

$$y(5) = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 2 & 2 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} 2 \\ 5 \\ 2 \end{bmatrix}$$

1 44

-1 0 4

3 4 -4

-3 -7 -2

1 1 2

1 2 0

{1, 4, 3, 0, 7, 4, -7, -7, -1, 3, 4, 3, -2}

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 and Discrete time signal processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : H		**Course Handling Faculty :** Mr K.Sambath Kumar		
1.	VTU19316	KOTHAPALLI CHANDRA NITHIN	C	1
2.	VTU19475	SIRIGIRI YASWANTH SAI	C	3.5
3.	VTU19509	DUDEKULA BHARGAVA MOULI	C	6.5
4.	VTU19859	POOJARI UDAY PAVAN	C	AB
5.	VTU20631	SIDDA SURYA VENKATA DURGA	C	13
6.	VTU20770	UMMINENI THIRUPATHI NAIDU	C	4.5
7.	VTU20819	B SHIVA PRASAD	C	AB
8.	VTU20893	SANGATHALA NAGA NITHIN KUMAR	C	0
9.	VTU20899	THRIPURARIPATLA SAI MANOJ	C	AB
10.	VTU20998	DOMMARAJU PAVAN SRI RAM	C	11
11.	VTU21003	S VENKATA SURYA PRAKASH ROYAL	C	2
12.	VTU21032	PALADUGU GOPI	C	11
13.	VTU21102	VANGA ADI VISHNU MANIKANTA	C	4.5
14.	VTU21105	K SRIKANTH	C	AB
15.	VTU21276	MUDEDLA SYAM DEEPAK	C	11

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Not regular to classes
2. Lack of practice.
3. Poor exam preparation.
4. Not good in general mathematics

Action Planned:

1. Slip test planned to conduct.
2. Student attendance can be informed to mentors.
3. Special classes planned to conduct.

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : Discrete time signal processing — CourseCode:10211EC111

Course Handling Faculty: Mr. K.Sambath Kumar (Sec – H) — Academic Year:2023 – 2024

Course Coordinator : Dr. S. Jana — Semester : Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									SL Class
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									

SL – Slow Learner's Class

Faculty

Course Coordinator

HOD

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-24

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 & Discrete time signal processing

Course Coordinator : Dr.Jana S

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : H		**Course Handling Faculty :**Mr.K.Sambath Kumar			
1	VTU19316	KOTHAPALLI CHANDRA NITHIN	A	A	RA
2	VTU19475	SIRIGIRI YASWANTH SAI	1.5	3	AB
3	VTU19509	DUDEKULA BHARGAVA MOULI	2.5	5.5	D
4	VTU19859	POOJARI UDAY PAVAN	A	1	RA
5	VTU20631	SIDDA SURYA VENKATA DURGA	3.5	15	D
6	VTU20770	UMMINENI THIRUPATHI NAIDU	2.5	10	D
7	VTU20819	B SHIVA PRASAD	1	6.5	NE
8	VTU20893	SANGATHALA NAGA NITHIN KUMAR	A	A	D
9	VTU20899	THRIPURARIPATLA SAI MANOJ	A	15	NE
10	VTU20998	DOMMARAJU PAVAN SRI RAM	9	20	D
11	VTU21003	S VENKATA SURYA PRAKASH ROYAL	1.5	5	D
12	VTU21032	PALADUGU GOPI	1	9	D
13	VTU21102	VANGA ADI VISHNU MANIKANTA	3.5	1	RA
14	VTU21105	K SRIKANTH	5.5	23	D
15	VTU21276	MUDEDLA SYAM DEEPAK	8.5	11.5	RA

Action Taken:

1. Special classes were conducted
2. Important topics and related tutorial problems were solved
3. Slip test were conducted

Improvements Observed:

Four students got pass mark in T-3. No improvements for others due to lack of attendance

Faculty

Course Coordinator

HOD Sign

SEC H

Class Teacher

| | | |

S. Yaswanth Sai : VTU 19475

1) Interpolate the following seqvence by a factor

$I = 2$ and $\hat{I} = 3$

$x(n) = \{2^n\}$, for $n = 0$ to 3

2) Decimate the following seqvence $x(n) = \{1, 2, 3, 4, 5, 6, 7, 8\}$ with factor 2 and 3.

1A)

$$x(n) = \{1, 2, 3, 4, 5, 6, 7, 8\}$$

$\hat{I} = 2$

$$y(m) = x\left(\frac{m}{I}\right)$$

$m = 0$

$$y(0) = x\left(\frac{0}{2}\right) \quad x(0) = 1$$

$m = 1$

$$y(1) = x\left(\frac{1}{2}\right) \quad x(0.5) = 0$$

$m = 2$

$$y(2) = x\left(\frac{2}{2}\right) \quad x(1) = 2$$

$m = 3$

$$y(3) = x\left(\frac{3}{2}\right) \quad x(1.5) = 0$$

$m = 4$

$$x\left(\frac{4}{2}\right) \quad x(2) = 4$$

$m = 5$

$$y(5) = x\left(\frac{5}{2}\right) x(2.5) = 0$$

$m = 6$

$$y(6) = x\left(\frac{6}{2}\right) x(3) = 8$$

$m = 7$

$$y(7) = x\left(\frac{7}{2}\right) x(3.5) = 0$$

$\therefore y(n) = \{1, 0, 2, 0, 8, 0\}$

---

2) $x(n) = \{1, 2, 3, 4, 5, 6, 7, 8\}$

$D = 2, \quad D = 3$

$m = 0$

$m = 1 \quad y(0) \; x \; \frac{0}{2} \; x(0) = 0$

$m = 2 \quad y(1) \; x \; \frac{1}{2} \; x(1) = 1$

$m = 3 \quad y(2) \; x \; \frac{2}{2} \; x(2) = 2$

$m = 4 \quad y(3) \; x \; \frac{3}{2} \; x(3) = 3$

$m = 5 \quad y(4) \; x \; \frac{4}{2} \; x(4) = 4$

$m = 6 \quad y(5) \; x \; \frac{5}{2} \; x(5) = 5$

$m = 7 \quad y(6) \; x \; \frac{6}{2} \; x(6) = 6$

$m = 8 \quad y(7) \; x \; \frac{7}{2} \; x(7) = 7$

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 Discrete Time Signal Processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : A I		**Course Handling Faculty :** Mr.M.Pandiyarajan		
1.	VTU19002	YALAGALA JANAKI RAMAIAH	C	AB
2.	VTU19160	LOKESH B	C	AB
3.	VTU19651	ADIKE VEERA HITESH KUMAR REDDY	C	0
4.	VTU20656	GAJJALA RAJU	C	7
5.	VTU20707	AKUNURI BAJI BABU	C	5
6.	VTU20772	BATHALA GANESH	C	AB
7.	VTU20907	RAMELLA SASI KIRAN	C	2
8.	VTU20915	KARUTURI VENKATA KRISHNA SAIPAVAN	C	2
9.	VTU21024	M HRUSHIKESH BHARADWAJ	C	3.5
10.	VTU21043	BETHINA BHANU KRISHNA MOULI	C	4
11.	VTU21073	PUJARI HEBBATAM VINOD KUMAR	C	AB
12.	VTU21153	SAIKRISHNA N	C	AB
13.	VTU21191	PASUPULETI SAI RAM	C	4

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Students are irregular to the class and exhibit lack of interest in studies.
- Slow learners have difficulty in calculation part and are not attentive in class

Action Planned:

- To conduct class test for practice
- To give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 Discrete Time Signal Processing

Course Coordinator : Dr.S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : I		**Course Handling Faculty :** Mr.M.Pandiyarajan			
1.	VTU19002	YALAGALA JANAKI RAMAIAH	4.5	6.5	RA
2.	VTU19160	LOKESH B	AB	AB	RA
3.	VTU19651	ADIKE VEERA HITESH KUMAR REDDY	AB	10	RA
4.	VTU20656	GAJJALA RAJU	0.5	8	D
5.	VTU20707	AKUNURI BAJI BABU	AB	6	NE
6.	VTU20772	BATHALA GANESH	AB	15	D
7.	VTU20907	RAMELLA SASI KIRAN	AB	3	AB
8.	VTU20915	KARUTURI VENKATA KRISHNA SAIPAVAN	AB	3	D
9.	VTU21024	M HRUSHIKESH BHARADWAJ	3	2.5	D
10.	VTU21043	BETHINA BHANU KRISHNA MOULI	AB	1	RA
11.	VTU21073	PUJARI HEBBATAM VINOD KUMAR	0.5	3	D
12.	VTU21153	SAIKRISHNA N	7.5	10.5	C
13.	VTU21191	PASUPULETI SAI RAM	5	9	NE

Action Taken:

1.Special classes were conducted for slow learners to discuss important questions.

2. Slip test is conducted.

Improvements Observed:

1.Some students performance in CIA is increased after conducting special class and slip tests.

2.Slight Improvements in Internal marks

3. Six students passed in end semester exam

Faculty **Course Coordinator** **HOD Sign**

Sec I

Slow Learners Class

CLASS D.T.S.P. SEM Summer 23-24 COURSE Digital Time Signal Processing

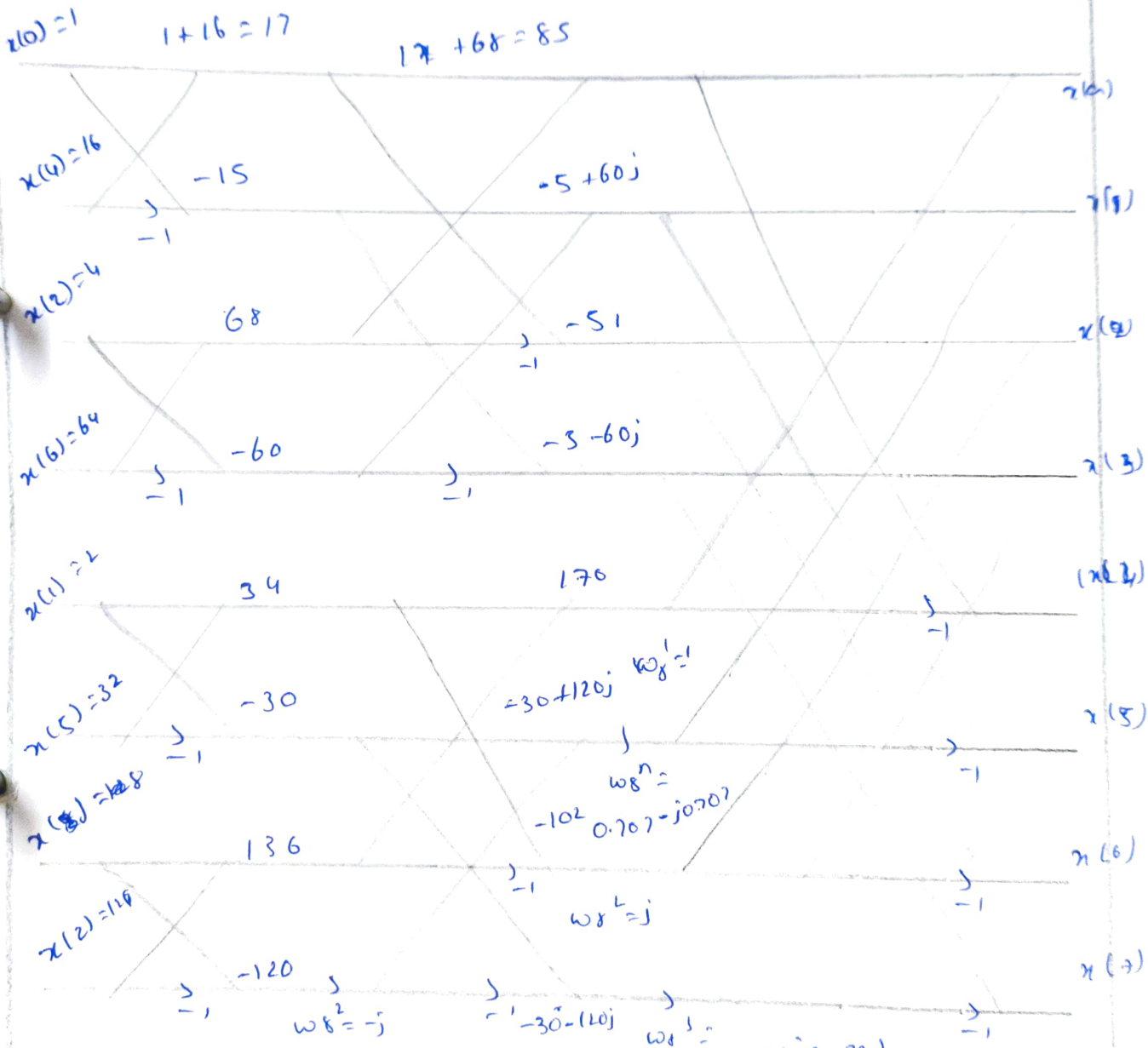
		Month							
		Date	16/8	16/8	30/8	3/8	11/10	1/10	[illegible]
		Hour	Sat	4	3	4	3	4	3 4
[illegible]	Y Janaki Ramaiah		1	2	3	4	5	6	7 8
19160	Lokesh B		1	2	3	4	5	6	A A
19681	A V Hitesh Kumar Reddy		1	2	A	A	3	4	5 6
20656	G Raju		1	2	A	A	3	4	5 6
20707	A Baji Babu		A	A	1	2	3	4	5 6
20712	B Ganesh		1	2	3	4	5	6	7 A
20907	R Sasi Kiran		A	A	1	2	3	4	A A
20915	K V Krishna Saipavan		A	A	1	2	A	A	3 A
21024	M H Bharadwaj		1	2	3	4	A	4	5 6
21043	B B Krishna Mouli		1	2	3	4	5	6	7 6
21073	P H Vinod Kumar		1	2	3	A	A	4	5 6
21153	Saikrishna N		1	2	3	4	A	A	5 6
21191	Pasupuleti Sai Ram		A	A	A	A	1	2	A A
	Topics discussed								
16/8/23	Design of Butterworth filter		2	M.Pavan					
30/8/23	Design of Chebyshev filter		2	M.Pavan					
11/10/23	Limit cycle oscillations - overflow & zero input.		2	M.Pavan					
11/10/23	Output Count off Noise power		2	M.Pavan					
			4	4	3	4	4	2	[illegible]

B. Ganesh
VTU20772

Given $x(n) = \{1, 2, 4, 8, 16, 32, 64, 128\}$

find $f(k)$ with DIT-FFT.

$\therefore N = 8$



$x(0) = 255$

$x(1) = 48.63 + 166.05j$

$x(2) = -51 + j102$

$x(3) = -78.63 + 46.05j$

$x(4) = -85$

$x(5) = -78.63 - 54.05j$

$x(6) = -51 - 102j$

$x(7) = 48.63 - 166.05j$

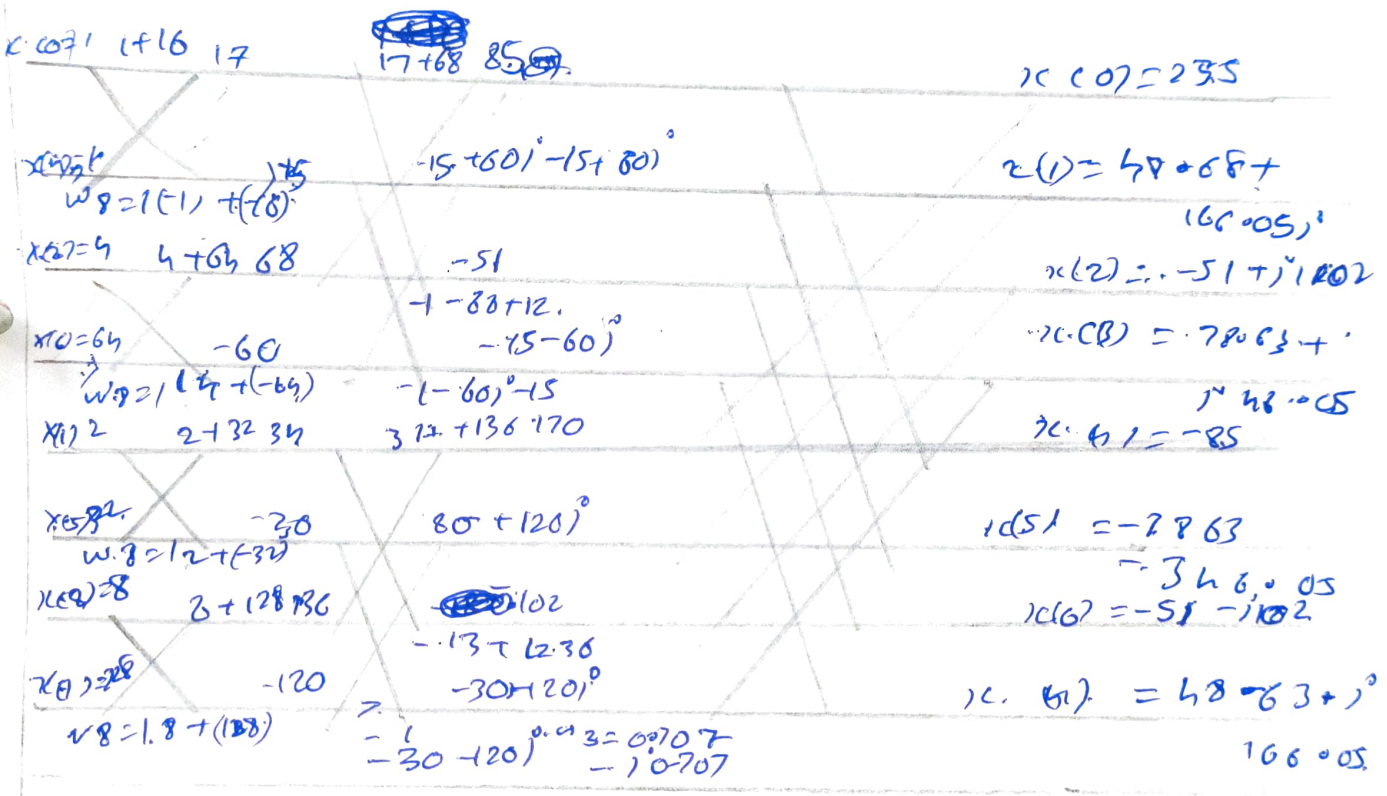
$\therefore x(k) = \{255, 48.63 + j166.05, -51 + 102j, -78.63 + j46.05, -85, -78.63 - j46.05, -51 - j102\}$

VTU21043

Given $x(n) = \{1, 2, 4, 8, 16, 32, 64, 128\}$

Find $X(k)$ with DIT - FFT

$\therefore N = 8$.



$\therefore x(k) = \{255, 48.63 + j166.05, -51 + j120, -78.63 + j46.05, -35, -78.63 - j46.05, -51 - j102, 48.63 - j166.05\}$

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : D		**Course Handling Faculty : Dr C. Raja**		
1.	VTU20717	MUNDLURU PURNAKISHORE	C	A
2.	VTU20739	VEGURU PREM CHAND	C	11.5
3.	VTU19603	YARAMALA BHARATH KUMAR REDDY	C	A
4.	VTU20409	MUKKERA GOPI CHAND REDDY	C	12
5.	VTU20896	KODURI AJAY KUMAR	C	A
6.	VTU24102	SHUBHAM GOLDER	C	A
7.	VTU20924	MULE MADHAVA REDDY	C	11.5
8.	VTU21201	KOTTE LOKESH	C	8
9.	VTU21212	CHAKALI ANIL KUMAR	C	11
10.	VTU19743	KUDUMULA ROHITH	C	2
11.	VTU20714	MULI NANDAKISHORE REDDY	C	AB
12.	VTU20968	KANTIPUDI DURGA SANDEEP KUMAR	C	8
13.	VTU20536	NARALA PRANAY KUMAR	C	4
14.	VTU20705	VENKAT DINESH KUMAR G	C	4

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in mathematics and are not attentive in class

Action Planned:

Given class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTR UGE21
10211EC111 & DISCRTE TIME SIGNAL PROCESSING

SLOW LEARNERS REMEDIAL CLASS Time Table

	I 8.45 9.35	II 9.45 10.35	III 10.45 11.35	IV 11.45 12.35		V 1.45 2.35	VI 2.45 3.35	VII 3.45 4.35	VIII 4.45 5.35
Mon									
Tue									
Wed									
Thu				SL (Sec D) DTSP					
Fri									
Sat									

Faculty (Dr. C. RAJA)

Course co-ordinator

HoD

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	ES
Section : D		Course Handling Faculty : Dr C. Raja			
1.	VTU20717	MUNDLURU PURNAKISHORE	2	10	D
2.	VTU20739	VEGURU PREM CHAND	1	13	D
3.	VTU19603	YARAMALA BHARATH KUMAR REDDY	A	5	RA
4.	VTU20409	MUKKERA GOPI CHAND REDDY	2.5	AB	RA
5.	VTU20896	KODURI AJAY KUMAR	A	5.5	RA
6.	VTU24102	SHUBHAM GOLDER	2	0	AB
7.	VTU20924	MULE MADHAVA REDDY	A	10	AB
8.	VTU21201	KOTTE LOKESH	A	11	RA
9.	VTU21212	CHAKALI ANIL KUMAR	A	6	D
10.	VTU19743	KUDUMULA ROHITH	7	15	RA
11.	VTU20714	MULI NANDAKISHORE REDDY	3	10	RA
12.	VTU20968	KANTIPUDI DURGA SANDEEP KUMAR	5	10	RA
13.	VTU20536	NARALA PRANAY KUMAR	0.5	10	D
14.	VTU20705	VENKAT DINESH KUMAR G	AB	AB	RA

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Faculty
(Dr. C. RAJA)

Course Coordinator

HOD Sign

Slow learners Class

CLASS: III D SEM: V COURSE: DTSP

	Roll No.	Name	Month	SEP			OCT		
			Date	7/9	14	21	5	12	
			Hour	4	4	4	4	4	
1	VTU20717	M. Purnakaishore		1	2	A	3	4	
2	VTU20739	V. prem Chand		1	2	A	3	4	
3	VTU19603	Bharath kumar Reddy		1	2	3	4	5	
4	VTU20409	M. Gopi chand		1	2	A	3	4	
5	VTU20894	Koduri Ajay Kumar		1	2	3	4	5	
6	VTU24102	S. Golder		1	2	3	4	5	
7	VTU20924	Mule Madhava Reddy		1	2	3	4	5	
8	VTU21201	Kotte lokesh		1	A	2	3	A	
9	VTU21212	C Anil kumar		1	2	3	4	5	
10	VTU19743	K. Rohith		1	2	3	4	5	
11	VTU20714	M. Nandakishore Reddy		1	2	A	3	4	
12	VTU20968	K. Durga Sandeep kumar		1	2		3	4	5
13	VTU20536	N. Pranay Kumar		1	2	3	4	5	
14	VTU20705	V. Dinesh kumar Gr.		1	2	3	4	5	
15									
16									
17		7/9/23 Illustrations in IIR filter dsign							
18		14/9/23 Illustrations in IIR filter structures							
19		21/9/23 Filter design (more ex problems)							
20		5/10/23 FIR filter design							
21		12/10/23 Structures of FIR.							
22									
23									
24									
25									
26									
27									
		No. of Absentees		-	1	3	-	2	
		Initials							

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DEPARTMENT OF ECE
VTR UGE 21B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the student in CIA			
			T 2	T 3		End Semester Result
Section : C		Course Handling Faculty : Dr. R.Rajkumar				
1.	VTU20669	BELLAMKONDA SUDHARSHAN	5	24		RA
2.	VTU20754	KURUVA DURGA PRASAD	8	15		C
3.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	AB	23		C
4.	VTU21195	BEZAWADA PURNA PHANI SAI	7	27.5		D
5.	VTU19103	KOUDI SRIKANTH REDDY	4.5	23		RA
6.	VTU20032	MANDADI AJAY KRISHNA	9.5	8		D

Action Taken:
Conducted the 4 Hours Revision Classes
Gave Problems for Practice

Improvements Observed:
Out of six members five members have shown improvement in Test 3.

Faculty In-Charge **Course Coordinator** **HOD / ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	Test I
Section : C		**Course Handling Faculty :**Dr. R.Rajkumar		
1.	VTU20669	BELLAMKONDA SUDHARSHAN	C	7
2.	VTU20754	KURUVA DURGA PRASAD	C	9
3.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	C	4
4.	VTU21195	BEZAWADA PURNA PHANI SAI	C	6
5.	VTU19103	KOUDI SRIKANTH REDDY	C	3.5
6.	VTU20032	MANDADI AJAY KRISHNA	C	1

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

1. Lack of Attendance
2. Mathematical Complexity
3. Lack of practice

Action Planned:

1. Planned to conduct special class
2. Planned to give more practice

Faculty Signature **Course Coordinator** **HOD ECE**

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DEPARTMENT OF ECE

VTR UGE 2021

Slow Learner's Remedial Class Time Table

Course Title:Discrete Time Signal Processing
Course Handling Faculty: Dr. R.Rajkumar
Course Coordinator : Dr. S. Jana

CourseCode:10211EC111
Academic Year:2023 – 2024
Semester: Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday									
Wednesday									
Thursday									
Friday			SL Class	SL Class					
Saturday						SL Class			

SL – Slow Learner's Class

Faculty In-Charge **Course coordinator** **HOD/ECE**

Slow Learners Sample. Sec: C.

VTU 20032
AJAY KRISHNA

1. Use overlap save method, find $y(n)$ with the given sequence $x(n) = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 7, 5, 3, 1\}$ and $h(n) = \{2, 4, 6, 8\}$

Given

$x(n) = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 7, 5, 3, 1\}$

$h(n) = \{2, 4, 6, 8\}$

$x_1(n) = \{0, 0, 1, 2, 3\}$.

$x_2(n) = \{2, 3, 4, 5, 6\}$

$x_3(n) = \{5, 6, 7, 8, 9\}$

$x_4(n) = \{8, 9, 7, 5, 3\}$

$x_5(n) = \{5, 3, 1, 0, 0\}$ $\quad h(n) = \{2, 4, 6, 8, 0\}$.

$y_1(n) = x_1(n) \sim h(n)$

$$= \begin{bmatrix} 0 & 3 & 2 & 1 & 0 \\ 0 & 0 & 3 & 2 & 1 \\ 1 & 0 & 0 & 3 & 2 \\ 2 & 1 & 0 & 0 & 3 \\ 3 & 2 & 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 0 + 12 + 12 + 8 + 0 \\ 0 + 0 + 18 + 16 + 0 \\ 2 + 0 + 0 + 24 + 0 \\ 4 + 4 + 0 + 0 + 0 \\ 6 + 8 + 6 + 0 + 0 \end{bmatrix} = \begin{bmatrix} 32 \\ 34 \\ 26 \\ 8 \\ 20 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 6 & 5 & 4 & 3 \\ 3 & 2 & 6 & 5 & 4 \\ 4 & 3 & 2 & 6 & 5 \\ 5 & 4 & 3 & 2 & 6 \\ 6 & 5 & 4 & 3 & 2 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 4+24+30+32+0 \\ 6+8+36+40+0 \\ 8+12+12+48+0 \\ 10+16+18+16+0 \\ 12+20+24+24+0 \end{bmatrix} = \begin{bmatrix} 90 \\ 90 \\ 80 \\ 60 \\ 80 \end{bmatrix}$$

$$y_2 = \{90, 90, 80, 60, 80\}$$

$$y_3(n) = x_3(n) \otimes h(n).$$

$$\begin{bmatrix} 5 & 9 & 8 & 7 & 6 \\ 6 & 5 & 9 & 8 & 7 \\ 7 & 6 & 5 & 9 & 8 \\ 8 & 7 & 6 & 5 & 9 \\ 9 & 8 & 7 & 6 & 5 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 10+36+48+56+0 \\ 12+20+34+64+0 \\ 14+24+30+49+0 \\ 16+28+36+40+0 \\ 18+32+42+43+0 \end{bmatrix} = \begin{bmatrix} 150 \\ 130 \\ 147 \\ 120 \\ 135 \end{bmatrix}$$

$y_4(n) = x_4(n) * h(n)$

$$\begin{bmatrix} 8 & 3 & 5 & 7 & 9 \\ 9 & 8 & 3 & 3 & 7 \\ 7 & 9 & 8 & 3 & 5 \\ 5 & 7 & 9 & 8 & 3 \\ 3 & 5 & 7 & 9 & 8 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 16 + 12 + 30 + 56 + 0 \\ 18 + 32 + 18 + 40 + 0 \\ 14 + 36 + 48 + 24 + 0 \\ 10 + 28 + 54 + 64 + 0 \\ 6 + 20 + 42 + 72 + 0 \end{bmatrix}$$

$$= \begin{bmatrix} 114 \\ 108 \\ 122 \\ 156 \\ 140 \end{bmatrix}$$

$y_4(n) = \{114, 108, 122, 156, 140\}$.

$y_5(n) = x_5(n) \otimes h(n)$.

$$\begin{bmatrix} 5 & 0 & 0 & 1 & 3 \\ 3 & 5 & 0 & 0 & 1 \\ 1 & 3 & 5 & 0 & 0 \\ 0 & 1 & 3 & 5 & 0 \\ 0 & 0 & 1 & 3 & 5 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 6 \end{bmatrix}$$

$$= \begin{bmatrix} 10+ & 0 + & 0 + & 8 + 0 \\ 6 + & 20 + & 0 + & 0 + 0 \\ 2 + & 12 + & 30 + & 0 + 0 \\ 0 + & 4 + & 24 + & 40 + 0 \\ 0 + & 0 + & 0 + & 24 + 0 \end{bmatrix}$$

$$= \begin{bmatrix} 18 \\ 26 \\ 44 \\ 68 \\ 24 \end{bmatrix}$$

$y(n) = \{26, 8, 20, 80, 60, 80, 147, 120, 135, 122, 156, 140, 44, 68, 24\}$

Give the specification $\alpha_p = 2dB$ $\alpha_s = 50dB$ $\Omega_p = 300$ rad/sec $\Omega = 750$ rad/sec. Determine order of the filter.

The filter is Chebyshev filter.

$$N \geq \frac{\cosh^{-1}\left(\sqrt{\frac{10^{0.1\alpha_s}-1}{10^{0.1\alpha_p}-1}}\right)}{\cosh^{-1}\left(\frac{\Omega_s}{\Omega_p}\right)}$$

$\alpha_p = 2dB$

$\alpha_s = 50dB$

$\Omega_p = 300$ rad/sec.

$\Omega_s = 750$ rad/sec

$\alpha_p = 10^{0.1\alpha_p} = 10^{0.1\times 2} = 1.585$

$\alpha_s = 10^{0.1\alpha_s} = 10^{0.150} = 31622.7766$

By using formula.

$$N \geq \frac{\cosh^{-1}\left(\sqrt{\frac{31622.7766-1}{1.585-1}}\right)}{\cosh^{-1}\left(\frac{750}{300}\right)}$$

$N \geq 2.61$

$N = 3.$

iii) Derive the frequency response of Linear FIR filter for Symmetrical impulse response if N is odd.

$$h[n] = h(N-1-n).$$

N = filter order.

freq response of Linear phase FIR.

$$H(e^{j\Omega}) = A^* e^{-j\Omega(N-1)/2}.$$

$$n = ((N-1)/2)$$

$$h(n) = A^* \delta[n-(N-1)/2].$$

where $\delta[n]$

1 when $n=0$

0 otherwise.

Z-transform of I.R.

$$H(z) = \sum [h[n] * z^{(-n)}, n = -\infty \text{ to } \infty]$$

sub $h(n)$.

$$H(z) = A^* \sum [\delta(n-N-1/2)^* z^{(-n)}, n=-\infty \text{ to } \infty]$$

$$n = \frac{(N-1)}{2}$$

$$H(z) = A^* z^{-[(N-1)/2]}$$

Explain characteristics of Limit cycle oscillation with respect to the system described by the difference equation

$y(n) = 0.875\,y(n-1) + x(n)$.

determine the dead band.

$n=0$.

$0.875 \rightarrow (0.111)_2 \rightarrow 0.875$

$0.95(0.875) = 0.83125$

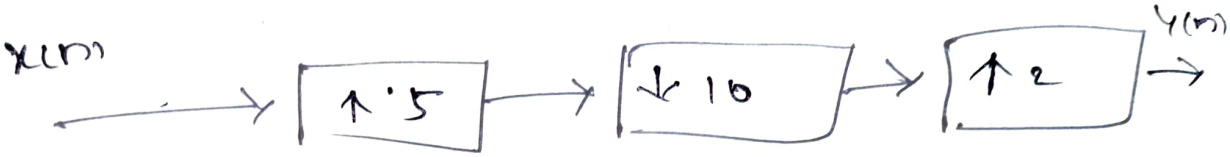
$0.875 = \frac{(001)}{2} \rightarrow 111 \Rightarrow 0.875$.

dead band $2^{-23} = 2^{-2}$

$= 1 - 0.25$

$= 0.75$.

v) For the multirate systems shown below, develop expression for output $y(n)$ as the function of the input $x(n)$.





$x_1(n) = x(n)\ 1/5$.



$x_2(n) = x(n)\left(\frac{10}{10}\right)$

$y(n) = x(n)\left(\frac{10}{10}\right) = x(n)$.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 – DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr. JANA S

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	Test I
Section : E		**Course Handling Faculty :** Dr. KOUSHICK VENKATESH		
1.	VTU20885	B ANAND JAGAN MOHAN RAO	C	11
2.	VTU20801	SHAIK AYAZ	C	06
3.	VTU21086	PALLI KARTHIK KUMAR	C	10
4.	VTU20778	NAVEEN KUMAR	C	06
5.	VTU21113	PRADEEPA G	C	LR

* LR – Late Registration (Not attended the Test – 1)

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Lack of Attendance
2. Late Registration
3. Carelessness in mathematical computation
4. Less concentration
5. Lack of attention in class and practice

Action Planned:

1. Planned to conduct special class
2. Planned to give more practice and assignments
3. Planned to give homework for ease understanding the concept
4. Planned to conduct special test

Faculty Signature **Course Coordinator** **HOD ECE**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learner's Remedial Class Time Table

Course Title: Discrete Time Signal Processing
Course Code: 10211EC111
Course Handling Faculty: Dr. Koushick Venkatesh (Section – E)
Academic Year: 2023 – 2024
Course Coordinator : Dr. S. Jana
Semester: Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									
Tuesday									
Wednesday									
Thursday									
Friday			SL Class	SL Class					
Saturday						SL Class			

SL – Slow Learner's Class

Faculty In-Charge **Course coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21 B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr. Jana S

S. No	VTU No.	Name of the Student	Performance of the student in CIA			
			T 1	T 2	T 3	End Semester Result
Section : E		Course Handling Faculty : Dr. Koushick Venkatesh				
1.	VTU20885	B ANAND JAGAN MOHAN RAO	11	10	13	RA
2.	VTU20801	SHAIK AYAZ	06	06	17	D
3.	VTU21086	PALLI KARTHIK KUMAR	10	AB	06	RA
4.	VTU20778	NAVEEN KUMAR	08	07	04	RA
5.	VTU21113	PRADEEPA G	11	06	15	AB

Action Taken:
Conducted the 6 Hours Revision Classes
Gave Problems for Practice
Question bank was circulated.

Improvements Observed:

Five out of two students passed in Test 3.

out of 5 students, 1 student Passed in End Semester Examination.

Faculty In-Charge **Course Coordinator** **HOD / ECE**

Slot - 5 Section - E

Dr. Koushick Venkatesh

ASS: 1631 III Yr. ECE SEM Sum... 02 11EC111 - DTSP

Roll No	Name Slow Learner's L...	Sep'23		Oct'23			
		3	28	14	14	28	28
		3	4	5	6	5	6
20885	B Anand Jagan Mohan B...	1	2	3	4	A	A
20801	Shaik Ayaz	1	2	3	4	A	A
21086	Palli Karthik Kumar	1	2	3	4	A	A
20778	Naveen Kumar		2	3	4	5	6
21113	Pradeepa	1	2	3	4	A	A
	Class log:-						
23.09.23	Revision Unit 2 & 3 - IIT, BLT, FIR						
14.10.23	Revision Unit-4						
	✓ Co-efficient Quantization						
	✓ Limit cycle oscillation						
28.10.23	Revision Unit-1						
	✓ DIT, DIF, DFT, IDFT						
	✓ Convolution						
No. of Absentees		—	—	—	—	04	04
Initials							

21113 - Pradeepa. G

Determine the convolution of 2 sequences

$x(n) = \{3, 2, 1, 2\}$

$h(n) = \{1, 2, 1, 2\}$

matrix

h(n) \ x(n)	3	2	1	2
1	3	2	1	2
2	6	4	2	4
1	3	2	1	2
2	6	4	2	4

$y(n) = \{3, 8, 8, 2, 9, 4, 4\}$

Tabular form:

x(n)	3	2	1	2
y(n)	1	2	1	2
	6	4	2	4
	3	2	1	2
	6	4	2	4
	3	2	1	2
	3	8	8	2	9	4	4

Circular convolution.

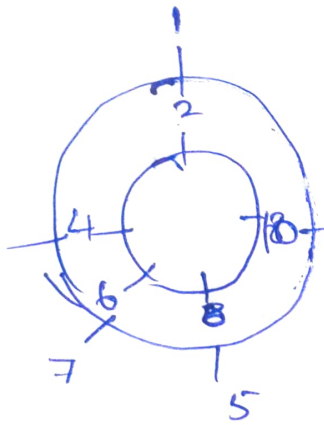
$x(n) = \{1, 3, 5, 7, 9\}$ and

$h(n) = \{2, 4, 6, 8, 10\}$

Given

$x(n) = \{1, 3, 5, 7, 9\}$

$h(n) = \{2, 4, 6, 8, 10\}$

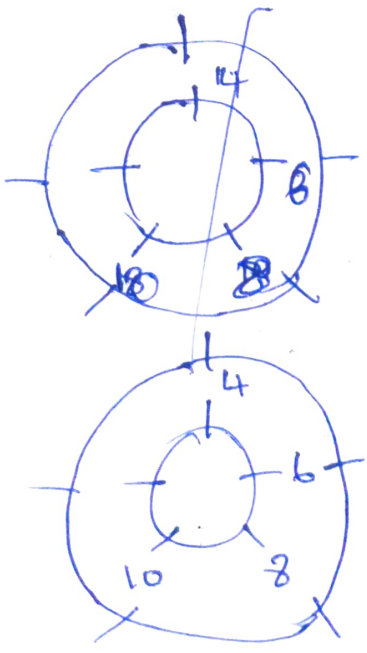
9. 

3 = 2 + 30 + 40 + 42 + 36

= 32 + 82 + 36

= 114 + 36

= 150



Circular convolution. (2)

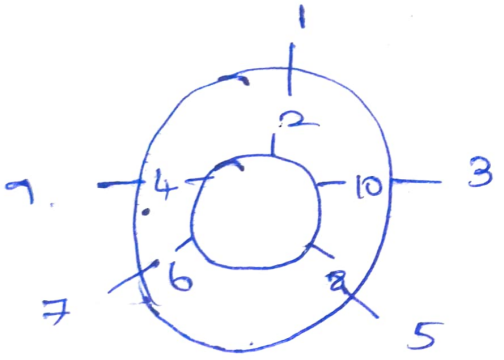
$x(n) = \{1, 3, 5, 7, 9\}$ &

$h(n) = \{2, 4, 6, 8, 10\}$.

Given

$x(n) = \{1, 3, 5, 7, 9\}$.

$h(n) = \{2, 4, 6, 8, 10\}$

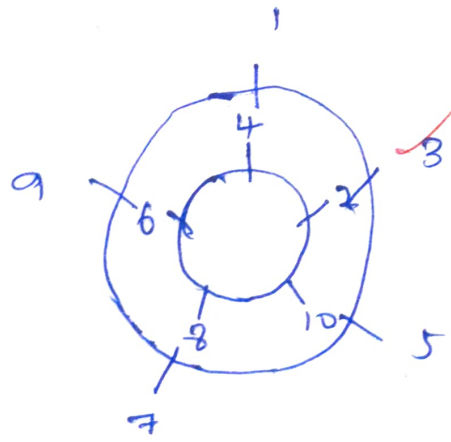


$= 2 + 30 + 40 + 42 + 36$

$= 32 + 82 + 36$

$= 114 + 36$

$= 150$.



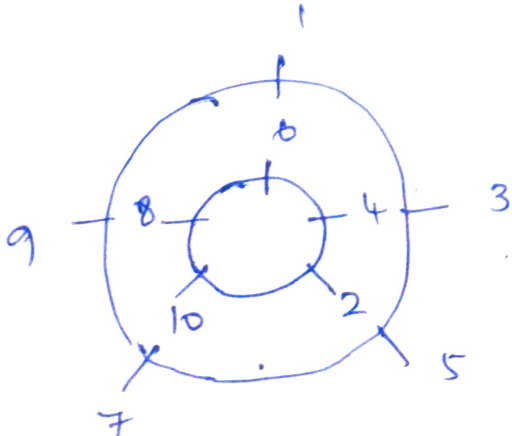
$= 4 + 6 + 50 + 56 + 54$

$\neq$

$= 10 + 50 + 110$

$= 60 + 110$

$= 170$.

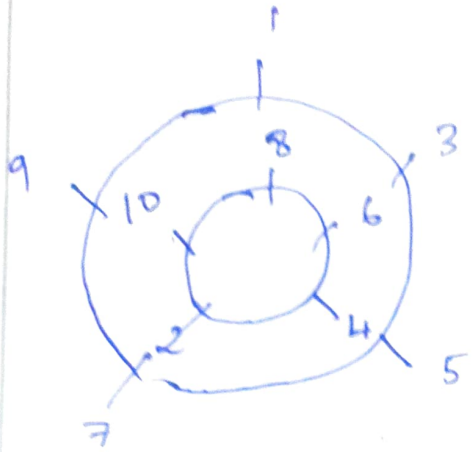


$= 6 + 12 + 10 + 70 + 72$

$= 80 + 72 + 18$.

$= 98 + 72$.

9869
Rajesh

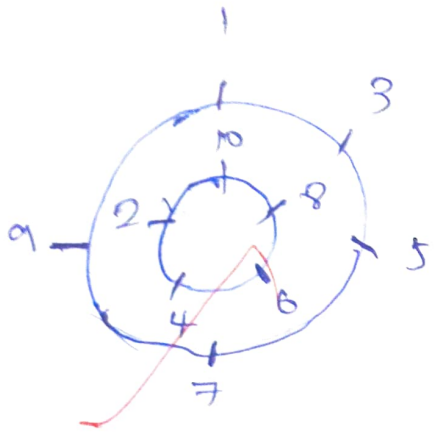


$= 8 + 18 + 20 + 14 + 90$

$= 26 + 20 + 104$

$= 46 + 104$

$= 150$



$= 10 + 24 + 30 + 28 + 18$

$= 34 + 30 + 46$

$= 64 + 46$

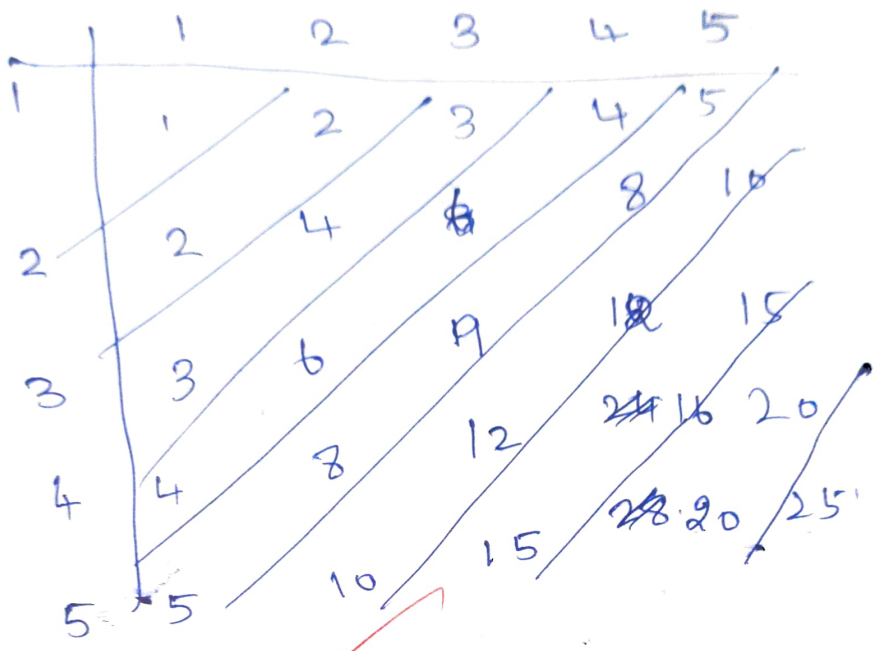
$= 110$

$y(n) = \{150, 170, 170, 150, 110.\}$

Cross Correlation.

$x_1(n) = \{1, 2, 3, 4, 5\}$

$x_2(n) = \{5, 4, 3, 2, 1\}$



$r_{xy}(n) = \{1, 4, 10, 20, 35, 44, 40, 25\}$.

$x(n) = \{1, 1, 2, 1\}$ $\quad h(n) = \{-1, 1\}$

$$x(n) = \begin{bmatrix} 1 & 1 & 2 & 1 \\ 1 & 1 & 1 & 2 \\ 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 1 \\ 1 & 2 & 1 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 1 \\ 0 \\ 0 \end{bmatrix}.$$

$$= \begin{bmatrix} -1+1 \\ -1+1 \\ -2+1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ -1 \end{bmatrix}$$

Overlap save method.

$h(n) = \{1, 1, 1\}$

$x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$

Using overlap save method.

$h(n) = \{1, 1, 1\} \Rightarrow M = 3.$

$x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$. $L = 10.$

$N = L + M - 1$

$= 12.$

$x_1(n) = \{0, 0, 3, -1, 0\}$

$x_2(n) = \{-1, 0, 1, 3, 2\}$

$x_3(n) = \{3, 2, 0, 1, 2\}$

$x_4(n) = \{1, 2, 1, 0, 0\}$

$h(n) = \{1, 1, 1, 0, 0\}$

$y_1(n) = x_1(n) \textcircled{*} h(n)$

$$\begin{bmatrix} 0 & 0 & -1 & 3 & 0 \\ 0 & 0 & 0 & -1 & 3 \\ 3 & 0 & 0 & 0 & -1 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & -1 & 3 & 0 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 3 \\ 2 \\ -2 \end{bmatrix}$$

$y_1(n) = \{-1, 0, 3, 2, 2\}.$

over Lap ADD.

$h(n) = \{-1, 1\}$

$x(n) = \{+1, -1, 2, -2, 3, -3, 4, -4\}$

?

$N = L + M - 1$

$= 18 + 2 - 1$

$= 19.$

$h(n) = \{-1, 1, 0, 0, 0\}$.

$x_1(n) = \{-1, 1, 2, -2, 0\}$.

$x_2(n) = \{3, -3, 4, -4\}$

$y_1(n) = x_1(n) \sim h(n)$.

$$\begin{bmatrix} -1 & 0 & -2 & 2 & -1 \\ 1 & -1 & 0 & -2 & 2 \\ 2 & 1 & -1 & 0 & -2 \\ -2 & 2 & -1 & -1 & 0 \\ 0 & -2 & 2 & -1 & -1 \end{bmatrix} \begin{bmatrix} -1 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -3 \\ 6 \\ -7 \\ 8 \\ -4 \end{bmatrix}$$

1 -2 -1 2 0.

. -3 6 -7 8 -4

1, -2, -1 2 -3 6 -7 8 -4

$y(n) = \{1, -2, -1, 2, -3, 6, -7, 8\}$

$y_2(n) = x_2(n) \circledast h(n)$

$$\begin{bmatrix} 1 & 2 & 3 & 1 & 0 \\ 0 & 1 & 2 & 3 & 1 \\ 1 & 0 & 1 & 2 & 3 \\ 3 & 1 & 0 & 1 & 2 \\ 2 & 3 & 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \\ 0 \\ 4 \\ 6 \end{bmatrix}$$

$y_2(n) = \{4, 1, 0, 4, 6\}$

$y_3(n) = x_3(n) \circledast h(n)$

$$\begin{bmatrix} 3 & 2 & 1 & 0 & 2 \\ 2 & 3 & 2 & 1 & 0 \\ 0 & 2 & 3 & 2 & 1 \\ 1 & 0 & 2 & 3 & 2 \\ 2 & 1 & 0 & 2 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 6 \\ 7 \\ 5 \\ 3 \\ 3 \end{bmatrix}$$

$y_3(n) = \{6, 7, 5, 3, 3\}$

$y_4(n) = x_4(n) \circledast h(n)$

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 2 \\ 2 & 1 & 0 & 0 & 1 \\ 1 & 2 & 1 & 0 & 0 \\ 0 & 1 & 2 & 1 & 0 \\ 0 & 0 & 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 4 \\ 3 \\ 1 \end{bmatrix}$$

$y_4(n) = \{1, 3, 4, 3, 1\}$

$y(n) = \{3, 2, 2, 4, 6, 5, 3, 3, 4, 3, 1\}$

MATRIX METHOD DFT

$$x(n) = \{1, 1, 0, 0\}$$

$N = 4$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -j & -1 & j \\ 1 & -1 & 1 & -1 \\ 1 & j & -1 & -j \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 2 \\ 1-j \\ 0 \\ 1+j \end{bmatrix}$$

$$X(K) = \{2, 1-j, 0, 1+j\}$$

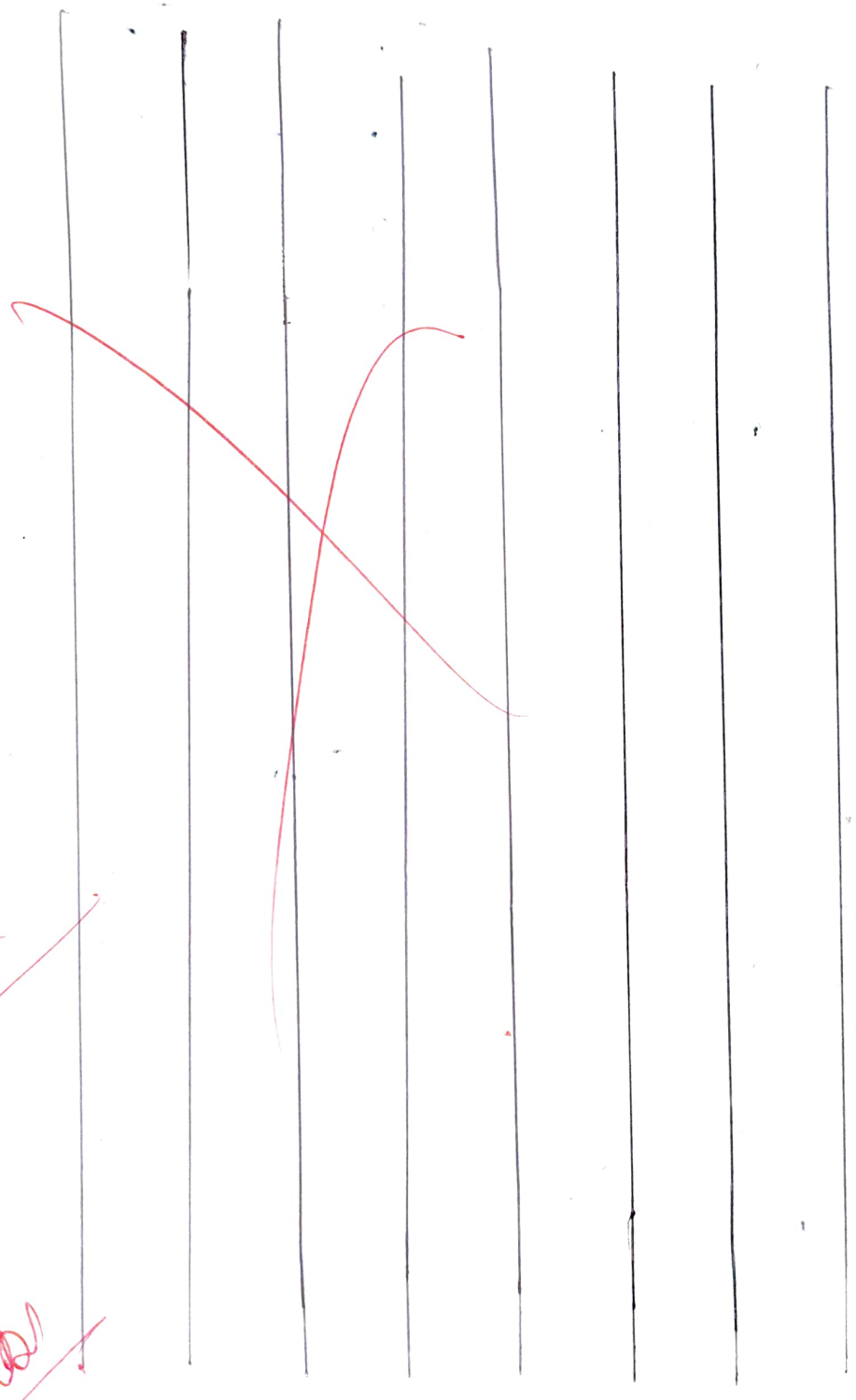
$$x(n) = \{0, 1, 2, 1\}$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -j & -1 & j \\ 1 & -1 & 1 & -1 \\ 1 & j & -1 & -j \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 4 \\ -2 \\ 0 \\ -2 \end{bmatrix}$$

$$x(k) = \{4, -2, 0, -2\}$$

9. $x(n) = \begin{cases} 0.5 ; & 0 \le n \le 3 \\ 0 ; & \text{otherwise} \end{cases}$

$x(n) = \{0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0\}$



meet me

No

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC111&Discrete time signal processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : F		**Course Handling Faculty : Dr B.Venkataramanaiah**		
1.	VTU20658	ALA PRATHYU SAI	C	6.5
2.	VTU20784	YARRAM MUSALA REDDY	C	AB
3.	VTU20799	PATCHAVA MANOJ KUMAR	C	AB
4.	VTU20869	AKKISETTY K SAI VENKTA KAMALESH	C	13
5.	VTU21052	BELLAMKONDA PHANEENDRA	C	12
6.	VTU21077	YARRAPOTHU PAVAN ADITHYA	C	10
7.	VTU21236	PAMUJULA JASWANTH	C	AB
8.	VTU24017	SUGUMAR T	C	00
9.	VTU24075	SARAGADAM GNANESWAR	C	06
10.	VTU24104	KOSURU LALITH SAI	C	3.5

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero)

Reason for Low Performance:

- Weak in mathematical concepts
- Irregular to class.
- Lack of preparation for Test

Action Planned:

1. .Slip test planned to conduct
2. Special classes planned to conduct.

Faculty

Course Coordinator

HOD Sign

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SCHOOLOFELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title :Discrete time signal processing — CourseCode:10211EC111

Course Handling Faculty: Dr B.Venkataramanaiah (Sec – F) — Academic Year:2023 – 2024

Course Coordinator : Dr. S. Jana — Semester : Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday									SL Class
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									

SL – Slow Learner's Class

Faculty

CC

HoD

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 & Discrete time signal processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : F		Course Handling Faculty : Dr B.Venkataramanaiah			
1.	VTU20658	ALA PRATHYU SAI	4	11	RA
2.	VTU20784	YARRAM MUSALA REDDY	15	11	D
3.	VTU20799	PATCHAVA MANOJ KUMAR	06	16	D
4.	VTU20869	AKKISETTY K SAI VENKTA KAMALESH	06	6	D
5.	VTU21052	BELLAMKONDA PHANEENDRA	6.5	9	D
6.	VTU21077	YARRAPOTHU PAVAN ADITHYA	5.5	12	D
7.	VTU21236	PAMUJULA JASWANTH	2	15	D
8.	VTU24017	SUGUMAR T	01	4	RA
9.	VTU24075	SARAGADAM GNANESWAR	02	11	RA
10.	VTU24104	KOSURU LALITH SAI	6	15	D

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed:

Three students showed improvement in test 3

Faculty

Course Coordinator

HOD Sign

Sec F

vtu20869
A.kamales

Sec-F

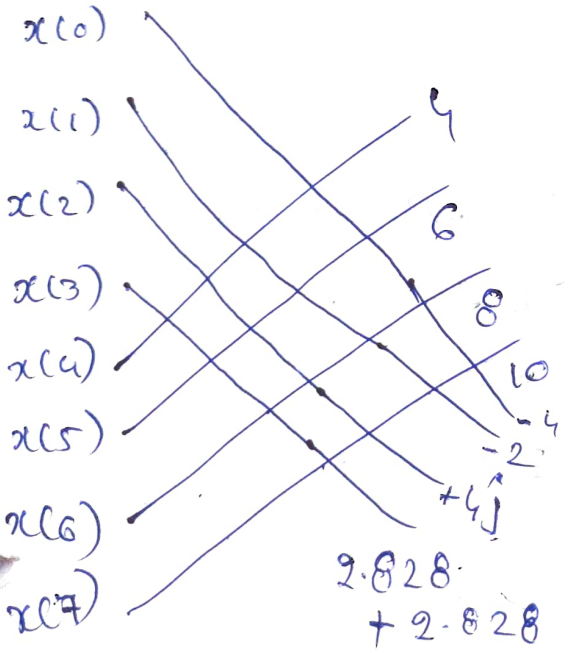
ompute the FFT using DIT algorithm for the sequence given by $x(n) = 2^n \; 0 \le n \le 7$

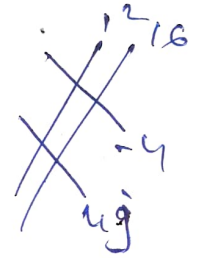
2. If $x_3(n)$ is the circular convolution of $x_1(n)$ & $x_2(n)$. determine $x_3(n)$ if $x_1(n) = \{1, 1, 1, 1\}$, $x_2(n) = \{-1, -2, -3, -4\}$

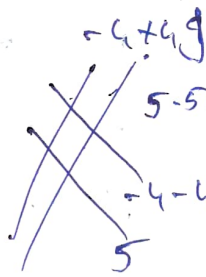
7 TO 8

Sol:-) Given $x(n) = 2^n \; 0 \le n \le 7$

$\{0, 1, 2, 3, 4, 5, 6, 7\}$







$x(0) = 28$

$x(4) = -4$

$x(2) = -4+4j$

$x(6) = -4-4j$

$x(1) = -4+9.568j$

$x(3) = -4+5.656j$

$x(7)$

$-4.936 - 56j$

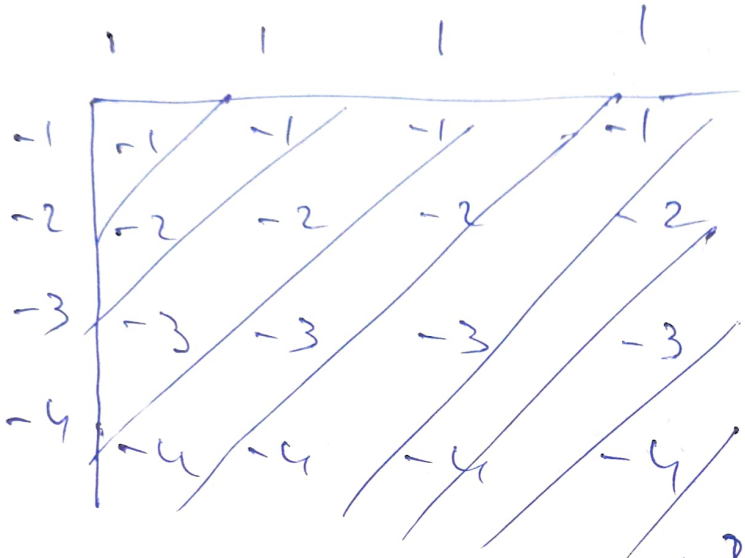
$x(k) = \{28, -4+9656j, -4+4j, -4+1.656j, -4, -4.8-1.63$
$-4-4j, -4-9.656j\}$

2

2) Given

$x_1(n) = \{1, 1, 1, 1\}$

$x_2(n) = \{-1, -2, -3, -4\}$



$\{-1, -3, -6, -10, -9, -7, -4\}$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ -2 \\ -3 \\ -4 \end{bmatrix} = \begin{bmatrix} 1(-1)+1(-2)+1(-3)+1(-4) \\ 1(-1)+1(-2)+1(-3)+1(-4) \\ 1(-1)+1(-2)+1(-3)+1(-4) \\ 1(-1)+1(-2)+1(-3)+1(-4) \end{bmatrix}$$

$$= \begin{bmatrix} -10 \\ -10 \\ -10 \\ -10 \end{bmatrix}$$



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr.S.JANA

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CATEGORY	TEST I
Section : G		**Course Handling Faculty :** Ms.Diana Earshia		
1.	VTU19899	GAJJALA PRANAY KUMAR REDDY	C	7.5
2.	VTU20272	AVULA ACHUTA RAMI REDDY	C	1.5
3.	VTU20273	JYOTHI JAGADEESHWAR REDDY	C	7
4.	VTU20740	ABHIRAJ KUMAR SINGH	C	0

Criteria for slow learners: Category C and Failures in TEST1(Consider absent as zero mark)

Reason for Low Performance:

20740 – Absenteeism

Others - Students find it difficult to solve on time, lack of practice.

Action Planned:

Worksheets/ home test to be given for improving practice.

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : Discrete Time Signl Processing — Course Code: 10211EC111

Course Handling Faculty: Diana Earshia V — Academic Year: 2023 – 2024

Course Coordinator : Dr. S. Jana — Semester : Summer

Day/Hour	8.45-9.35 AM	9.45-10.35 AM	10.45-11.35 AM	11.45-12.35 PM	LUNCH	1.45-2.35 PM	2.45-3.35 PM	3.45-4.35 PM	4.45-5.35 PM
Monday									
Tuesday									
Wednesday (25.10.23)									SL (Sec – G)
Thursday (26.10.23)									SL (Sec – G)
Friday (27.10.23)									SL (Sec – G)
Saturday									

SL – Slow Learner's Class

Faculty

Course Coordinator

HOD ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr.S.JANA

S.No	VTU No.	Name of the Student	Performance of the student in CIA		End Semester Result
			Test II	Test III	
Section : - G		Course Handling Faculty : Diana Earshia V			
1	VTU19899	GAJJALA PRANAY KUMAR REDDY	AB(3)	9	RA
2	VTU20272	AVULA ACHUTA RAMI REDDY	8	15	D
3	VTU20273	JYOTHI JAGADEESHWAR REDDY	AB(8)	9	D
4	VTU20740	ABHIRAJ KUMAR SINGH	AB(17)	15	RA

Action Taken:

1. Home assignment was given
2. Slip Test was written

Improvements Observed:

Students 20272 and 20740 have shown satisfactory improvement

Students 19899 and 20273 did not show satisfactory improvement, additional home tests were given for practice.

Faculty

Course Coordinator

HOD Sign

SLOW LEARNER'S CLASS

			OCT		
			25	26	27
			8	8	8
19599	Gajjala	Pranay Kumar	1	2	3
20272	Avula	Achuta Rama Reddy	1	2	A
20273	Jyothi	Jagadeeswar Reddy	1	2	A
20740	Abhiraj	Kumar Singh	A	1	2

SLOW LEARNER'S SCHEDULE

Record of Class Activities

S. No.	Date	Topics Covered	Content Delivery Method	Assessment Method	Learning Resources	C.C/M.C Sign	HOD Sign
1	25/8/23	Unit I Revision (FFT, Convolution	Chalk & Board PPT	NA	T1 - Digital Signal Processing - Proakis & Manolakis R4 - Digital Signal Processing - S. Salivahanan		
2	26/10/23	Unit III Revision (Hanning, Hamming)					
3	27/10/23	Unit II & IV Revision (coefficient Quantization floating pt arithmetic)					

$y(n) = x(n) + \alpha y(n-1)$

$b = 3$ $\quad \alpha = 0.5$

Types of quantization in rounding

n	x(n)	y(n-1)	$\alpha y(n-1)$	$Q[\alpha(y(n-1))]$
0	0.875	0	0.0	0.000
1	0	0.875	$0.5 \times 0.875 = 0.4375$	0.100 $2^{-1} = 0.5$
2	0	0.5	$0.5 \times 0.5 = 0.25$	0.010 $2^{-2} = 0.25$
3	0	0.25	$0.25 \times 0.25 = 0.125$	0.001 $2^{-3} = 0.125$
4	0	0.125	$0.5 \times 0.125 = 0.0625$	0.001 $2^{-3} = 0.125$

0.875

$0.4375 \times 2 = 0.8754$

$0.875 \times 2 = 0.1750$

$0.75 \times 2 = 1.50$

$0.5 \times 2 = 1.0$

~~VTU20273~~ VTU20273

J. Jagadeeshwar Reddy

$x(n)$	$y(n-1)$	$\alpha y(n-1)$	$\alpha(x)$	$y(n) = x(n) + \alpha[\alpha y(n-1)]$
0.875	0	0	0.000	0.875
0	8.875	0.4375	0.0111	0.5
0	0.5	0.05	0.10	0.25
0	0.25	0.125	0.001	0.125
0	0.125	0.0625	0.125	0.125
			0.001	
			0.125	

$0.4375 \times 2 \cdot 0.875$

$0.875 \times 2 = 1.75$

$0.75 \times 2 = 1.5$

$0.5 \times 2 = 106$

J. Jagadeeshwar Reddy
VTU 20273

Unit-4

compass fixed pts & flort spl

2) Define weka quen error

3) Define product qew error

4) mention effect of, quantiate, an pole location

1) :

Fixed Point Arithmetic

-) It is fast in operation

-) It has small dynamic range

=) It overlaps occurs addition

=) Floted Point Arithmetic

=) It is slow in operation

=) It has high dynamic rang

=) overlaps does not occurs addition

~~2) The dei define~~

2) The difference. ~~Difference~~ b/w quengtiozen DUPUT and actul input it is konw as Quantizion error.

4) Quantization of coefficients in digital filters leads to slight changes in their values, which modify the pole locations

3) Product Quantization error occurs at the output of multiplier and mutipication is called quantization in Pole location.

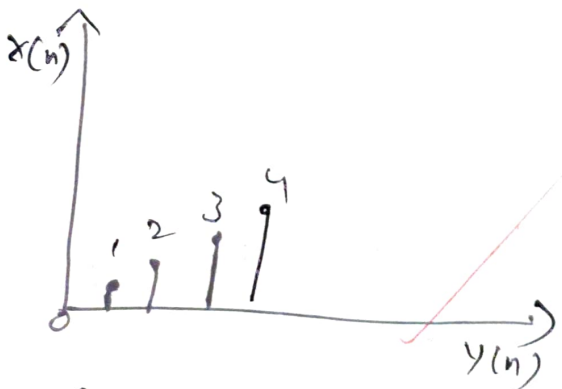
unit-5

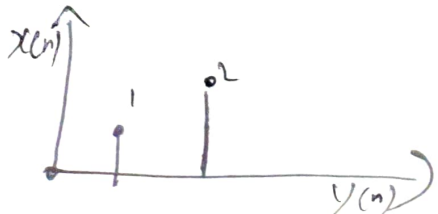
1) ⇒ Phase shifter

⇒ Transmutiplexer

⇒ vocoder

3)

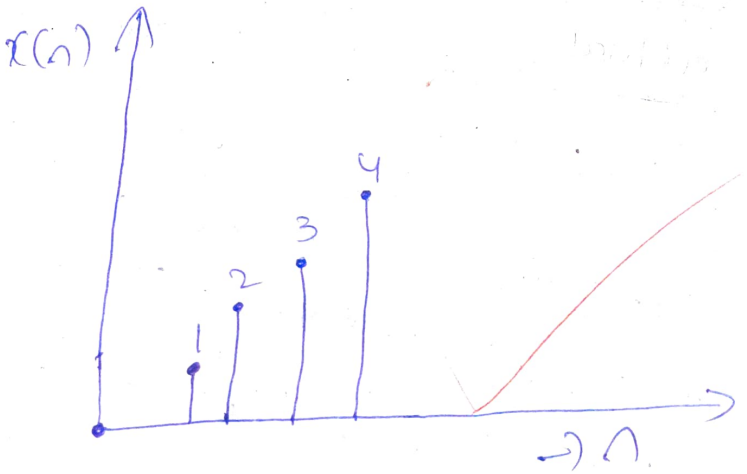


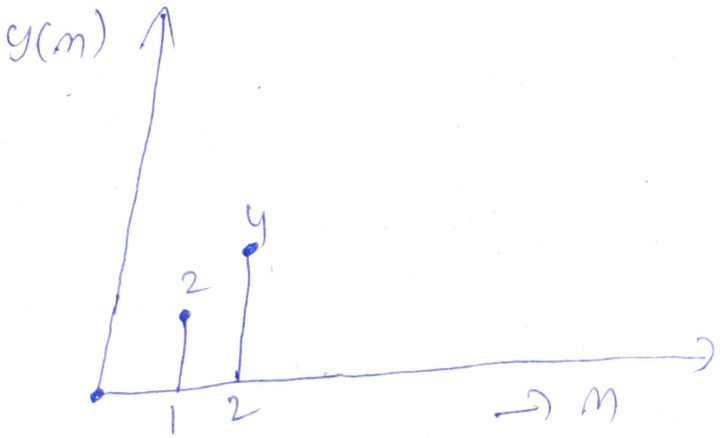


8A-) * Phase shifters
* Tran multiplexer
* Vocoder

9A-) Sub band coding is a method where speech signal is sub-divided into several frequency bands and each band is digitally encoded and separated by allocating different bits per sample to the signal of different sub-bands.

10A)





$x(n) \longrightarrow \boxed{\sqrt{2}} \longrightarrow y(n)$

Unit-4

G. Pranay

(A.) Fixed Point Arthemetic

1. It is fast in operation
2. It has small dynamic range
3. It overlaps occurs addition.

Float insp

1. It is slow in operation.
2. It has high dynamic range.
3. It doesn't occurs addition

2A.) Difference ~~Frequence~~ between quantization output and actual ~~occurs~~ input, it is known as quantization error

4A.) quantization of coefficients in digital filters lead to sight. Changes interpets values which modify the poles modification

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC111 & Discrete Time Signal Processing

Course Coordinator : Dr.S.Jana

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : J		**Course Handling Faculty :**Mr.S.Aswath		
1.	VTU19767	ADDANKI JOHN SUJITH	C	10.5
2.	VTU19884	SURAPUREDDY VENKATA SURENDRA REDDY	C	9.5
3.	VTU20817	UMMINENI KARTHEEK	C	6
4.	VTU20895	VANGUR VINAY KUMAR	C	9
5.	VTU21114	VAISHNAVI K	C	9
6.	VTU21128	PUNEETH KUMAR H	C	6
7.	VTU21142	HARISH R	C	9.5
8.	VTU19483	ALLADA HEMANTH	C	AB

Criteria for slow learners: Category 'C' &Failures in TEST 1

Reason for Low Performance:

1. Irregular to the class
2. Lack of preparation.
3. Lack of motivation.

Action Planned:

- Special classes are planned to conduct.
- Planned to give more practice on tutorial problems

Faculty Signature **Course Coordinator** **HOD/ECE**

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DEPARTMENT OF ECE

VTR UGE - 2021 B. TECH – ECE

SUMMER 2023 – 2024

SPECIAL TIME TABLE

SUBJECT/CODE: Discrete Time Signal Processing /10211EC111

S.NO	DATE	TIMING
1	24.08.2023	4.45 - 5.45
2	24.08.2023	5.45 - 6.45
3	06.09.2023	4.45 - 5.45
4	13.09.2023	4.45 - 5.45
5	21.09.2023	4.45 - 5.45
6	02.10.2023	4.45 - 5.45
7	03.10.2023	4.45 - 5.45

Faculty In charge

Course Coordinator

HOD

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC111 & Discrete Time Signal Processing

Course Coordinator : Dr.S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : J		**Course Handling Faculty :** Mr.S.Aswath			
1.	VTU19767	ADDANKI JOHN SUJITH	3	4	D
2.	VTU19884	SURAPUREDDY VENKATA SURENDRA REDDY	17.5	4	D
3.	VTU20817	UMMINENI KARTHEEK	11.5	8	D
4.	VTU20895	VANGUR VINAY KUMAR	11	7.5	D
5.	VTU21114	VAISHNAVI K	6	12.5	NE
6.	VTU21128	PUNEETH KUMAR H	1	6.5	D
7.	VTU21142	HARISH R	9	12	D
8.	VTU19483	ALLADA HEMANTH	AB	UN ENROLLED	–

Action Taken:

1. Slip tests were conducted.
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were revised once again.

Improvements Observed:

In T2 retests the marks have been improved. Where as for T3 it slumped because of irregular attendance.

Out of the 7 students who are eligible all got pass Mark in university exams.

Faculty Signature

Course Coordinator

HOD/ECE

SLOW LEARNER'S CLASS

CLASS: III ECE - 'J' SEM.: SS 23-24 COURSE: DTSP

Roll No.	Name	Month	AUG		SEP			OCT	
		Date	24	31	06	13	21	02	03
		Hour	8	9	8	8	8	8	8
VTU19767	A. JOHN SUJITH		A	A	1	2	3	4	5
19884	P. Venkata Surendra Reddy		1	2	3	4	A	5	A
20817	U. Karthick		1	2	3	A	4	A	5
20895	V. Vinay Kumar		1	2	3	4	5	A	A
21114	Vaishnavi. K		A	A	A	1	A	2	A
21128	Puneeth Kumar. H		1	2	3	4	5	6	A
21A42	Harish. R		1	2	A	3	4	5	6
19483	D. Lada Hemanth		A	A	A	A	A	A	A

RECORD OF CLASS WORK

Semester: SS 23-24

Class: ECE

Course: DTSP

S. No.	Date	Topics covered	No. of periods	Initials		
				Faculty	CC/MC	H.O.D
		UNIT - V - MULTIRATE SIGNAL PROCESSING, DSP PROCESSORS				
52)	6-10-23	Decimation, Interpolation	1			
53)	9-10-23	Sampling Rate conversion by a Rational factor, Polyphase structure	1			
54)	9-10-23	DSP Processors, Architecture, Pipelining, Harvard Architecture	1			
55)	10-10-23	TMS320C67XX Processor Architecture, Addressing Modes	1			
56)	10-10-23	Tutorial 5.1	1			
57)	13-10-23	Tutorial 5.2	1			
58)	16-10-23	ATP- Sub band Coding, Musical Sound Processing	1			
59)	16-10-23	Digital audio Sampling Rate conversion	1			
60)	17-10-23	Tutorial 5.3	1			
61)	20-10-23	Tutorial 5.4	1			
62)	31-10-23	Discussion of Univ Q.P	1			
		SLOW LEARNER'S CLASS				
1)	24-8-23	Overlap Add, Save	1			
2)	24-8-23	DIT, DIF	1			
3)	06-9-23	IIR filter - Analog	1			
4)	13-9-23	IIR filter - Digital	1			
5)	21-9-23	Slip Test - 01	1			
6)	02-10-23	Slip Test - 02	1			
7)	03-10-23	Quantization Errors	1			

8.7.

VTU20895

Sectional convolution

Overlap Save:

8/15

$x(n) = \{3, -1, 0, 3, 2, 0, 1, 1, 1\}$, $h(n) = \{1, 1, 1\}$

$L_s = 10$; $M = 3$

$$L = \frac{L_s}{M} = \frac{10}{3} = 3.33 \simeq 3$$

$$N = L + M - 1$$
$$= 3 + 3 - 1 = 5 \quad \boxed{N = 5}$$

The input sequence is divided into blocks of data of size n

$x_1(n) = \{M-1$ zeros, L data$\}$

$= \{0, 0, 3, -1, 0\}$

$x_2(n) = \{M-1$ perious data, it data$\}$

$= \{-a, 0, 1, 3, 2\}$

$x_3(n) = \{3, 2, 0, 2, 2\}$

$x_4(n) = \{1, 2, 1, 0, 0\}$

$\Rightarrow x_1(n) \sim h(n)$

$x_2(n) \sim h(n)$

$x_3(n) \sim h(n)$

$x_4(n) \sim h(n)$

$$y_1(n) = \begin{bmatrix} 0 & 0 & 3 & -1 & 0 \\ 0 & 0 & 0 & -1 & 3 \\ 3 & 0 & 0 & 0 & -1 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & -1 & 3 & 0 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 3 \\ 2 \\ 2 \end{bmatrix}$$

$y_2(n) = \{4, 1, 0, 4, 6\}$

$y_3(n) = \{6, 7, 5, 3, 3\}$

$y_4(n) = \{1, 3, 4, 3, 1\}$

$y(n) = \{3, 2, 2, 0, 4, 5, 3, 3, 4, 3, 1\}$

Overlap add:

$x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$

$h(n) = \{1, 1, 1\}$

$\frac{L}{m} = 10/3 = 3.33 = 3$

$N = L + m - 1$

$= 3 + 3 - 1$

$= 5$

$x_1(n) = \{3$ data pts $, m-1$ 0's $\}$

$x_2(n) = \{3$ data pts, $m-1$ 0's $\}$

$x_3(n) = \{3$ data pts $m-1$ 0's $\}$

$x_4(n) = \{3$ data pts $m-1$ 0's $\}$

$x_1(n) \mathbin{N} h(n)$

$x_2(n) \mathbin{N} h(n)$

$x_3(n) \mathbin{N} h(n)$

$x_4(n) \mathbin{N} h(n)$

$$y_1(n) = \begin{bmatrix} 3 & 0 & 0 & 0 & -1 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & -1 & 3 & 0 & 0 \\ 0 & 0 & -1 & 3 & 0 \\ 0 & 0 & 0 & -1 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \\ 2 \\ 1 \\ 0 \end{bmatrix}$$

$$y_2(n) = \begin{bmatrix} 1 & 0 & 0 & 2 & 3 \\ 3 & 1 & 0 & 0 & 2 \\ 2 & 3 & 1 & 0 & 0 \\ 0 & 2 & 3 & 1 & 0 \\ 0 & 0 & 2 & 3 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \\ 6 \\ 5 \\ 2 \end{bmatrix}$$

$$y_3(n) = \begin{bmatrix} 0 & 0 & 0 & 2 & 1 \\ 1 & 0 & 0 & 0 & 2 \\ 2 & 1 & 0 & 0 & 0 \\ 0 & 2 & 1 & 0 & 0 \\ 0 & 0 & 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 3 \\ 3 \\ 2 \end{bmatrix}$$

$$y_4(n) = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix}$$

$y(n) = 3\ 2\ 2\ -1\ 0$

$1\ 4\ 6\ 5\ 2$

$0\ 1\ 3\ 2\ 2$

$1\ 1\ 1\ 0\ 0$

$3\ 2\ 2\ 0\ 4\ 6\ 5\ 3\ 3\ 4\ 3\ 1\ 0\ 0$

$y(n) = \{3, 2, 2, 0, 4, 6, 5, 3, 3, 4, 3, 1, 0, 0\}$

Output noise power

$$H_1(z) = \frac{1}{z - z^{-1}}$$

$$\sigma_{e0}^2 = \sigma_e^2 \cdot \frac{1}{2\pi j} \oint H(z) \cdot H(z^{-1}) \cdot z^{-1} \cdot dz$$

use residue method to find I_1

$$I_1 = \left[\left(z - \tfrac{1}{2}\right) \cdot \frac{z/2}{\left(z - \frac{1}{5}\right)} \left(\frac{-1}{z-2}\right) z^{-1} \right]_{\text{at } z = \frac{1}{2}}$$

$z = 2$

$$+ \left[(z-2) \left[\frac{z/2}{\left(z - \frac{1}{2}\right)} \cdot \left(\frac{-1}{z-2}\right) \cdot z^{-1} \right] \right]_{\text{at } z = 2}$$

$|z| < 1$, omit

$z = 2$, NOW

$$I_1 = \left[\left(z - \tfrac{1}{5}\right) \frac{z/2}{\left(z - \frac{1}{2}\right)} \left(\frac{-1}{z-2}\right) z^{-1} \right]_{z = \frac{1}{2}}$$

$$I_1 = \left[\frac{\left(\frac{1}{2}\right)}{2} \frac{-1}{\frac{1}{2} - 2} \frac{1}{\left(\frac{1}{5}\right)} \right]$$

$$I_1 = 0.333$$

So, $\sigma_e^2 = \dfrac{2^{-2(8)}}{12}$

$$\sigma_e^2 = 1.2716 \times 10^{-6}$$

Rem!

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC111-Discrete Time Signal Processing

Course Coordinator : Dr.S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : L		**Course Handling Faculty :** Dr.V.Gnanaprakash		
1.	VTU19418	SAKTHIKUMAR S	C	11
2.	VTU20277	SANJAY KRISHNAN T	C	13
3.	VTU20734	KOTA JAY SRI RAM	C	AB
4.	VTU20848	SHAIK MOHAMMED ASIM	C	5
5.	VTU20852	PALAGIRI ALTHAF	C	12
6.	VTU20877	TELUGU SAI MADHAV	C	12
7.	VTU20884	NAKKA VENKATA SAI KRISHNA	C	6
8.	VTU20939	KAMANI RAMA KRISHNA	C	9
9.	VTU20992	GORLA UMESH CHANDRA	C	9
10.	VTU21090	KAKUMANI SRINU	C	11
11.	VTU21118	BHOOMIREDDY VISHNU TEJA REDDY	C	1
12.	VTU21158	TAMMISETTY MAHESH BABU	C	2
13.	VTU23941	RAJESH S	C	6

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:
Slow learners are irregular to the class and exhibit lack of interest in studies.
Slow learners have lack of knowledge in mathematical skills and calculation.

Action Planned:
Planned to give more practice by conducting test.
Planned to give revision after syllabus completion.

Faculty

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
SUMMER SEMESTER 2023 – 2024
SLOW LEARNERS TIME TABLE

Dr.V.Gnanaprakash

Day/Hour	I 8:45 am - 9:35 am	II 9:45 am - 10:35 am	III 10:45 am - 11:35 am	IV 11:45 am - 12:35 pm	LUNCH	V 1:45 pm - 2:35 pm	VI 2:45 pm - 3:35 pm	VII 3:45 pm - 4:35 pm	VIII 4:45 pm - 5:35 pm
Monday									
Tuesday									DTSP
Wednesday									
Thursday									
Friday									
Saturday									

HOD ECE

CLASS: III, SEC'L' SEM. SUMMER 2023-24 COURSE: DISCRETE TIME SIGNAL PROCESSING

	Roll No. / VTU ID	Name	Month	AUG				SEP				
		SLOW LEARNERS	Date	21	22	29	5	12	19	26		
			Hour	8	8	8	8	8	8	8		
1	19418	SAKTHIKUMAR S		a	a	a	/	/	/	/	a	
2	20277	SANJAY LOKISHAMANT		a	/	a	/	/	a	a	/	
3	20734	DOTA JAY SRI RAM		a	a	a	a	a	/	/	a	
4	20848	SHAIK MOHAMMED AZIM		/	/	/	/	/	a	/	/	
5	20852	PALAGIRI ALTHAF		/	/	a	/	a	/	/	a	
6	20877	TELUGU SAI MADHAV		/	/	/	a	/	a	/	a	
7	20884	NAKKA VENKATA SAI KRISHNA		/	/	/	/	/	a	/	/	
8	20939	KAMANI RAMAKRISHNA		/	/	/	/	/	/	/	a	
9	20992	GORLA UMESH CHANDRA		/	/	/	/	/	a	a	a	
10	21090	KAKUMANU SRINU		/	/	a	/	/	a	/		
11	21118	BHOOMIREDDY VISHNUTEJA REDDY		a	/	/	/	/	a	a		
12	21158	TAMMISETTY MAHESH BABU		a	a	/	/	/	a	/		
13	28941	RAJESH S		/	a	/	/	/	/	/		
14												
15		Topics Covered										
16	21/8/23	DIF - FFT Algorithm										
17	22/8/23	DIF-FFT Algorithm										
18	29/8/23	DIF fifth design										
	5/9/23	DIF fifth structure										
20	12/9/23	FIR filter design										
21	19/9/23	FIR filter structure										
22	26/9/23	Co-efficient Quantization Error										
23	03/10/23	Decimation & Interpolation										
24												
25												
26												
27												
	No. of Absentees			5	4	5	2	2	8	3		
	Initials											

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr.T.Kavitha		
1.	VTU20273	JYOTHI JAGADEESHWAR REDDY	C	6
2.	VTU20685	BANDI ANAND REDDY	C	AB
3.	VTU20907	RAMELLA SASI KIRAN	C	AB
4.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	C	7

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- Attendance Percentage is Poor
- Lack of preparation
- Difficult to solve the problems

Action Planned:

- To conduct Special class till University Exams
- To inform the less Attendance percentage and test marks to the respective mentors
- To handle Previous Year University Papers about how to present the answers in exam
- To conduct slip test from the Question Bank

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : A		**Course Handling Faculty :** Dr.T.Kavitha			
1.	VTU20273	JYOTHI JAGADEESHWAR REDDY	15	24.5	D
2.	VTU20685	BANDI ANAND REDDY	24	27	AB
3.	VTU20907	RAMELLA SASI KIRAN	5.5	11	AB
4.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	27	29.5	D

Action Taken:
Conducted special class and slip test.
Instructed the students to present the answers in a legible way.

Improvements Observed:

Two students got improved in university results

Faculty

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table (17.08.2023-12.10.2023)

Course Code and Title : 10211EC112 / Wireless Communication

Section : A

Course Coordinator : Dr. Kavitha T

S. No	Date	Timing
1	27/07/2023	4.45 pm – 5.35 pm
2	31/07/2023	4.45 pm – 5.35 pm
3	10/08/2023	4.45 pm – 5.35 pm
4	22/08/2023	4.45 pm – 5.35 pm
5	07/09/2023	4.45 pm – 5.35 pm
6	11/09/2023	4.45 pm – 5.35 pm
7	12/10/2023	4.45 pm – 5.35 pm
8	18/10/2023	4.45 pm – 5.35 pm

Course Coordinator

HOD/ECE

Special class - Slow learners

CLASS: III ECE SEM.: SUMMER COURSE: WC

	Month	July / August / Sept / Oct							
	Date	27	31	10	22	7	11	12	18
	Hour	8	8	8	8	8	8	8	8
20273	Jyothi Jagadeeshwar Reddy	1	2	3	4	5	6	7	8
20635	Bandi Anand Reddy	1	2	3	4	5	6	7	8
20907	Kamella Sasi kiran	1	2	3	4	5	6	7	8
20956	Chinna kusuma Nagakumar	1	2	3	4	5	6	7	8

Topics Covered

27/07/23	Cellular Concept, types of fading
31/07/23	Spread spectrum
10/08/23	Equalization & Rake Receiver
22/08/23	Diversity Combining
7/09/23	Multiple access, ALOHA
11/09/23	MIMO Systems
12/10/23	3GPP Network, LTE architecture
18/10/23	4G challenges

No. of ques	04	04	04	04	04	04	04	04
Ab.	00	00	00	00	00	00	00	00

No. of absentees

Remarks

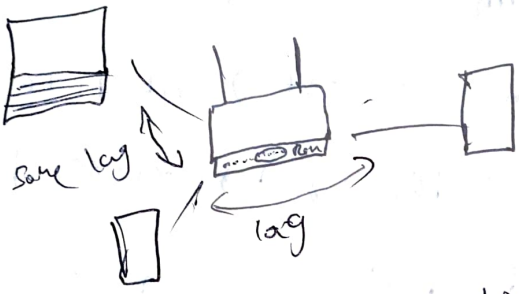
Name :- CH. Kusuma Naga Kumar UTU20956 17/10/2023

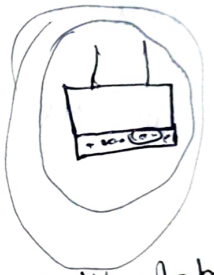
SU - MIMO

Single User - Multiple Input and Multiple output

this device not connect at a time a device their is a some lag of the connection

this device send signles in all the directions





*It send the signals all the directions without beam

MU-MIMO

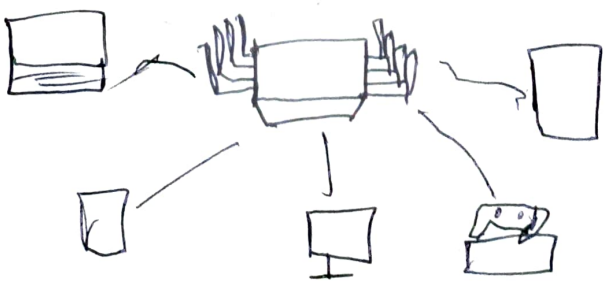
Multiple User- Multiple input and Multiple output

Now a days using this devices at all the places

it's coming on 2.4GHz with wifi 5

It send the some specific directions

It connecting the devices atthe sametime





* It send the singals in particular direction

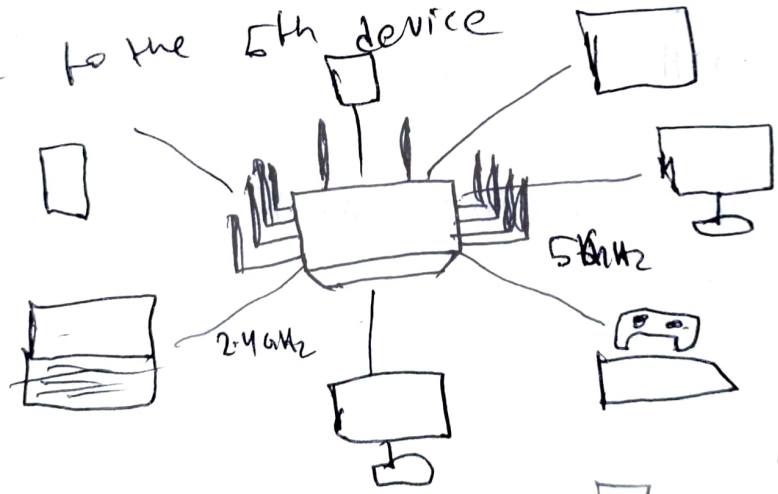
Abut all the MU-MIMO not supported all routers.

* it cones the 802.11c ac
* Then are also coming withe WiFi 6

The MU-MIMO as the various variations

2x2 → 2 antennas are 2 streams
3x3 → 3 antennas are 3 streams
4x4 → 4 antennas are 4 streams

The wifi 4x4 is the connecting at time, the 5th device try connecting the router change the bits connected to the 5th device



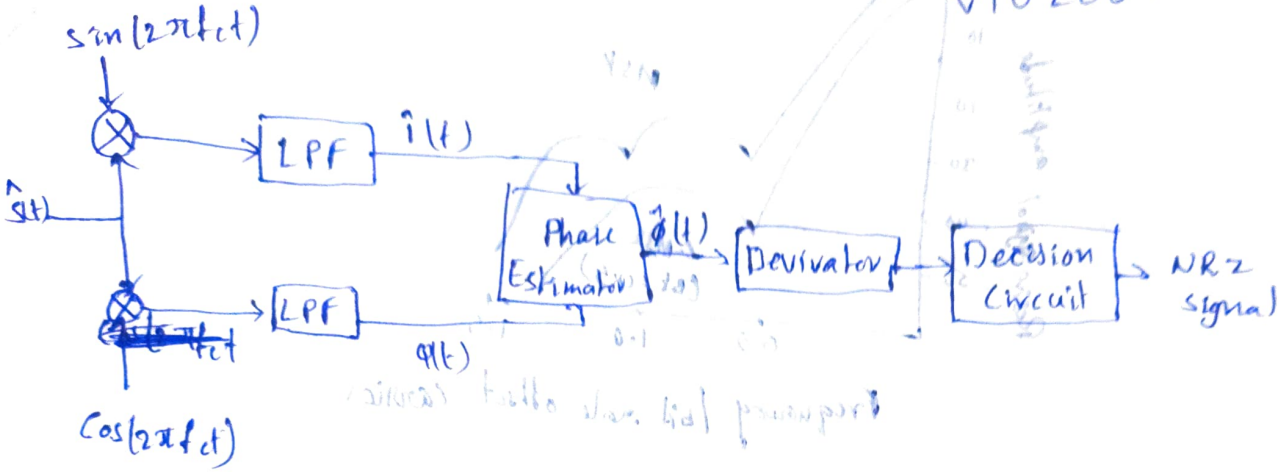


* MU-MIMO are the not buffering
* MU-MIMO it coming on wifi 5
* In 4x4 the four devices connted and external devices are connected.

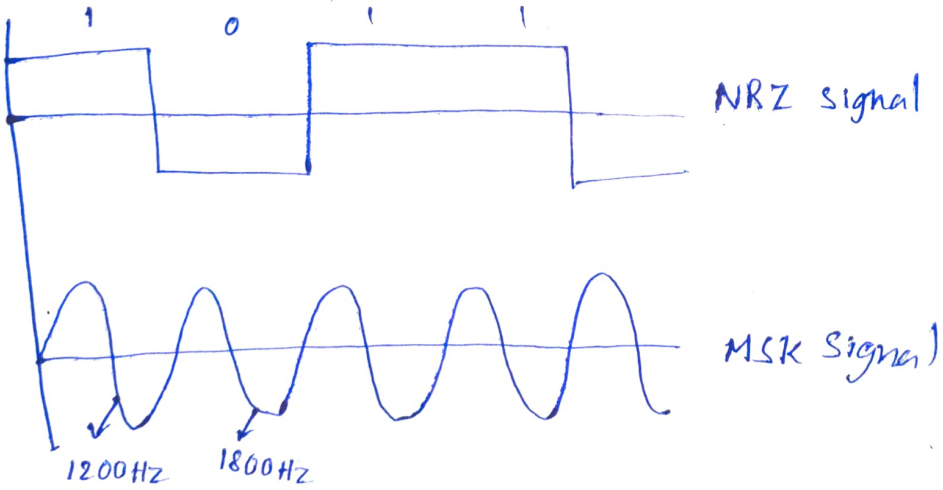
Wireless Communication

B. Anand Reddy
VTU 20685

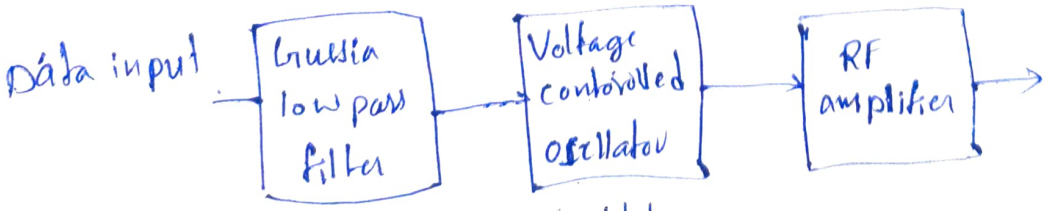
GMSK



MSK modulation / GMSK modulation

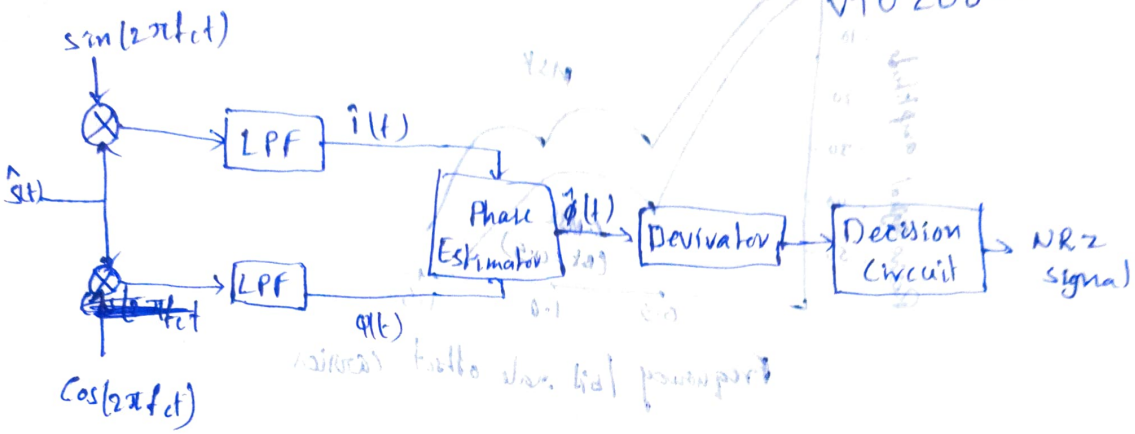


GMSK Modulator using VCO

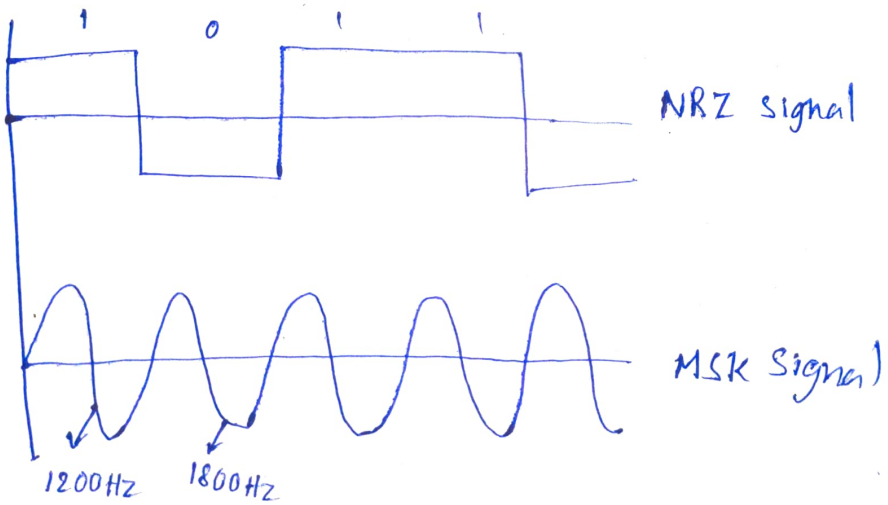


B.Anand Reddy
VTU 20685

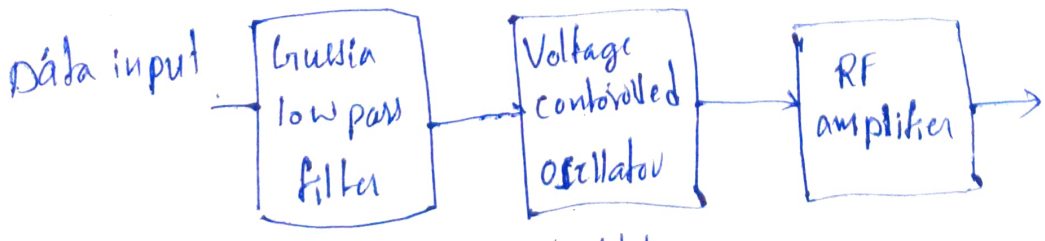
GMSK

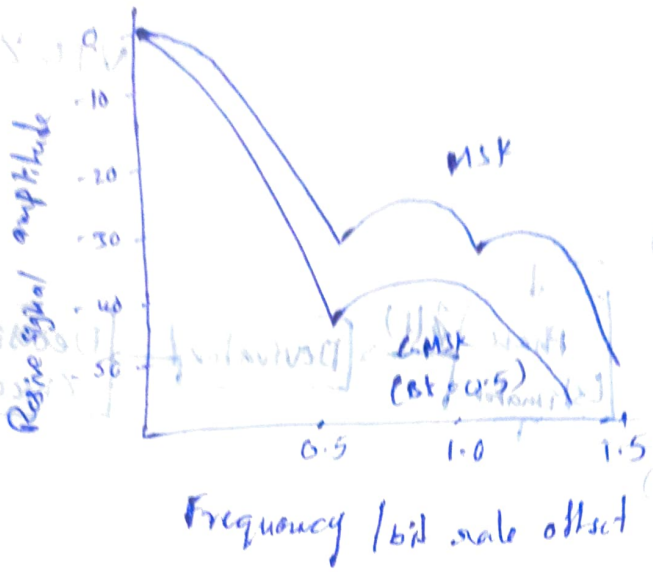


MSK modulation / GMSK modulation



GMSK Modulator using VCO

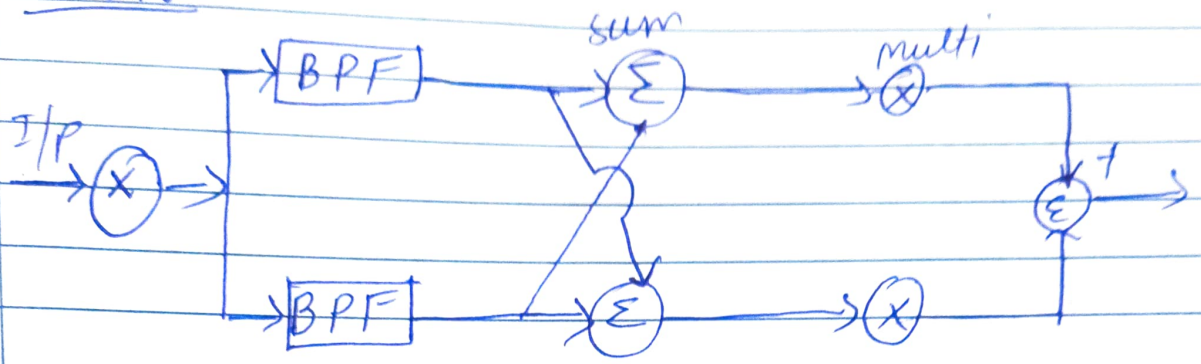



Relative signal amplitude
-10
-20
-30
-40
-50
MSK
GMSK
(BT = 0.5)
0.5
1.0
1.5
Frequency / bit rate offset (GMSK)

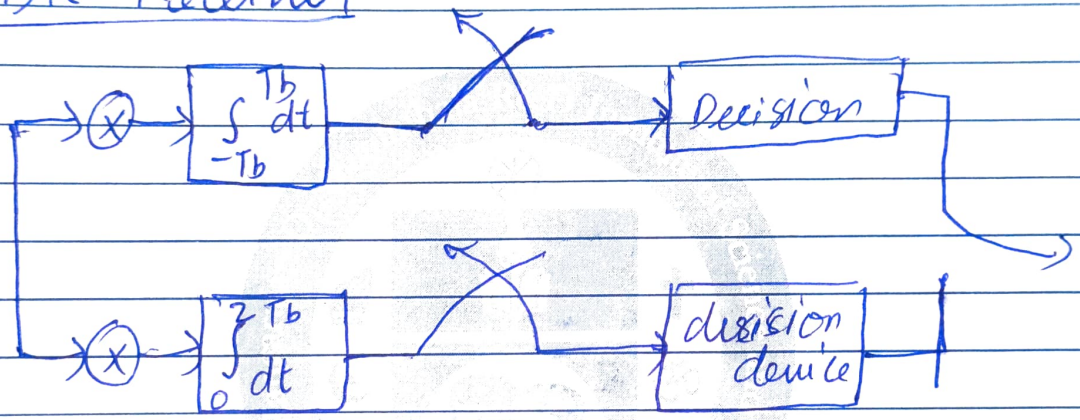
Expt. No.....

Page No.....

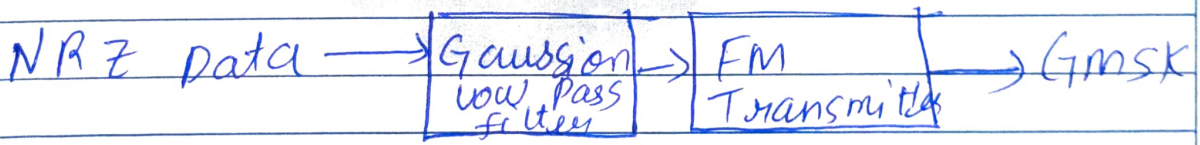
MSK



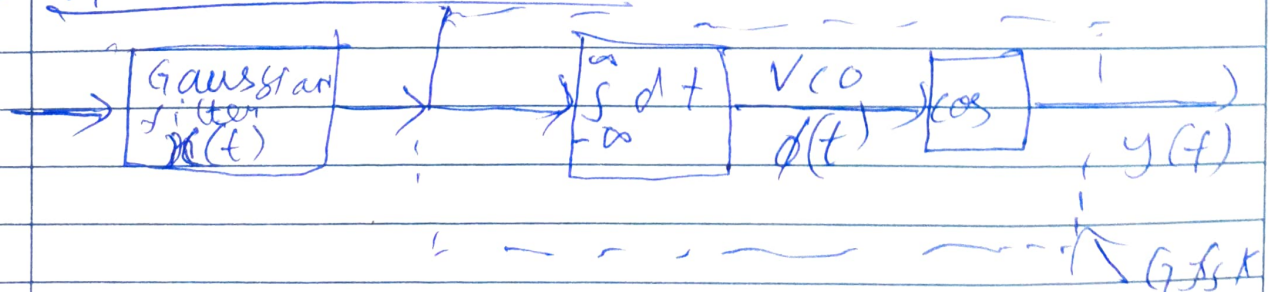
MSK Receiver



→ GMSK Transmitter

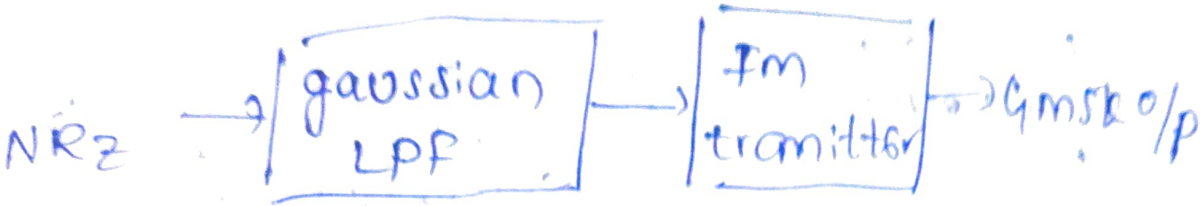


→ GMSK Transmitter

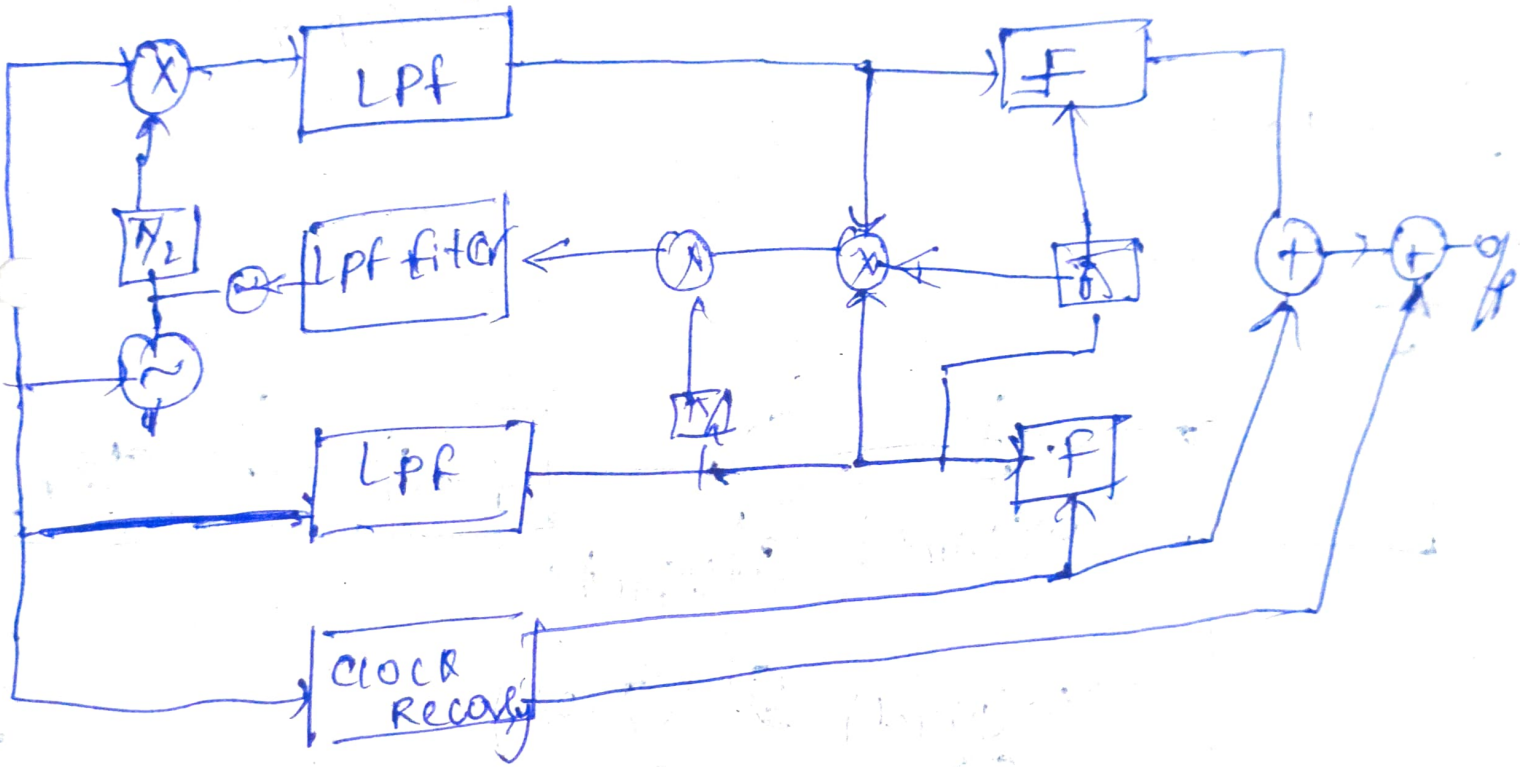


Y. Ashok Reddy
VTU 24024

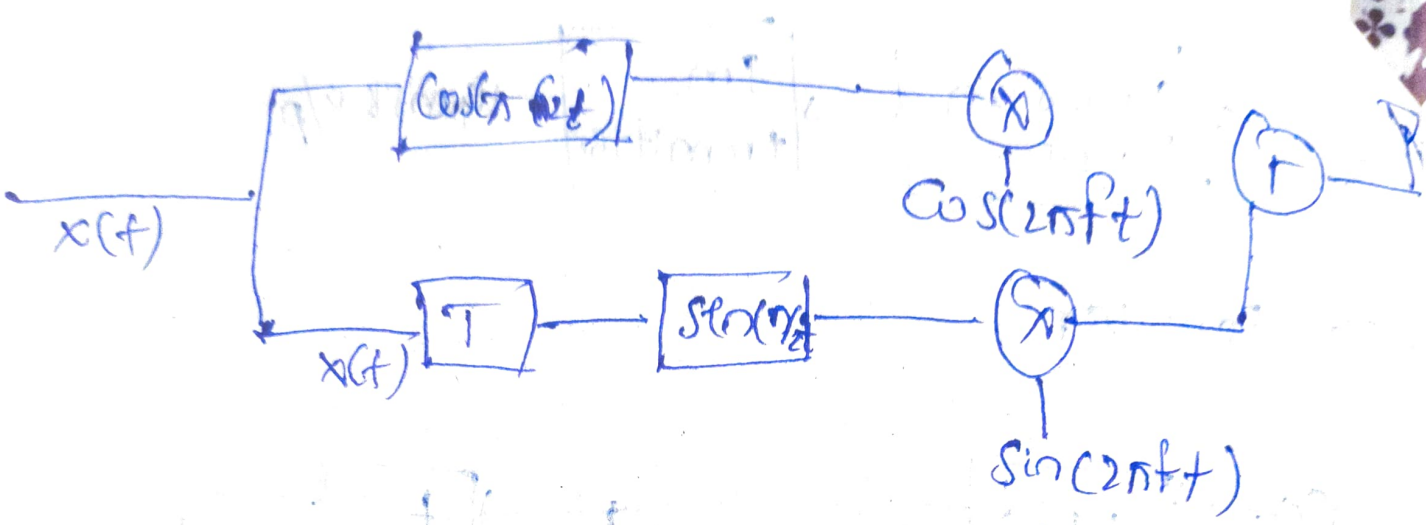
Transmitter:-



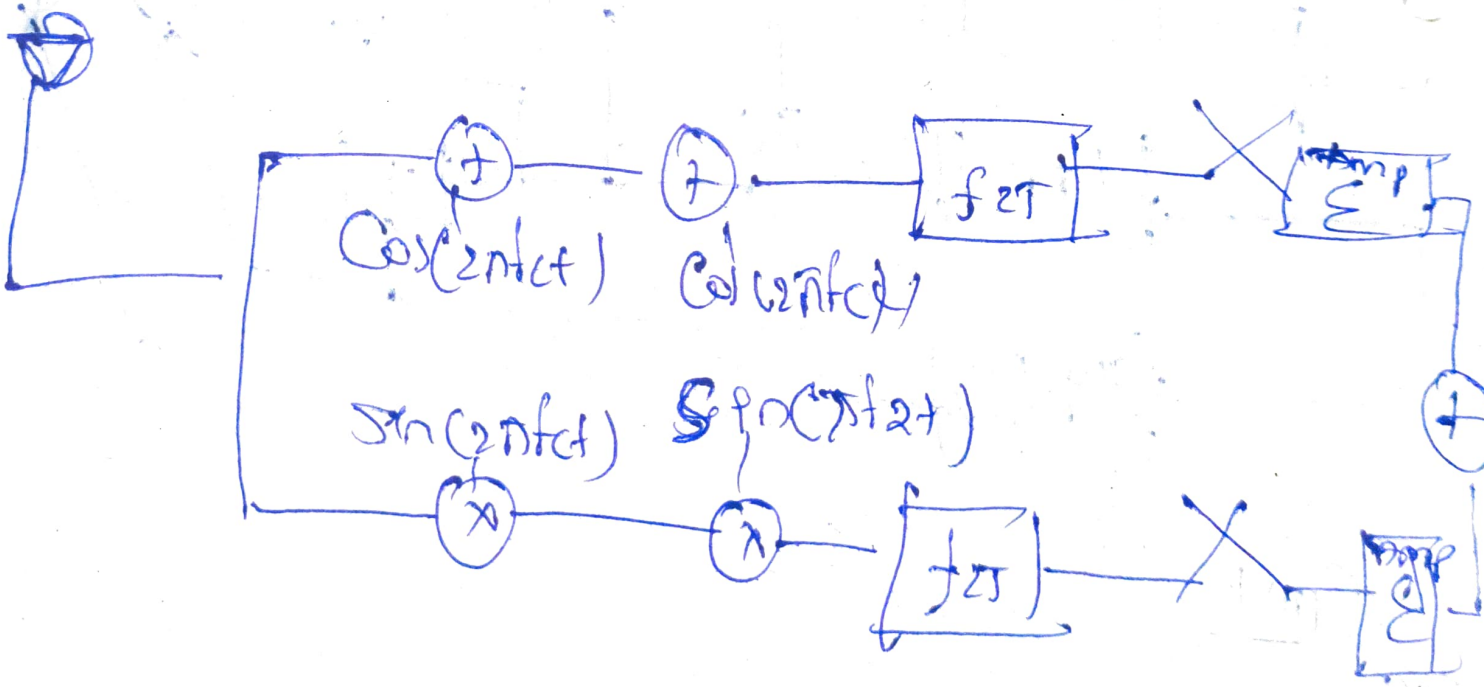
Gmsk Receiver:-



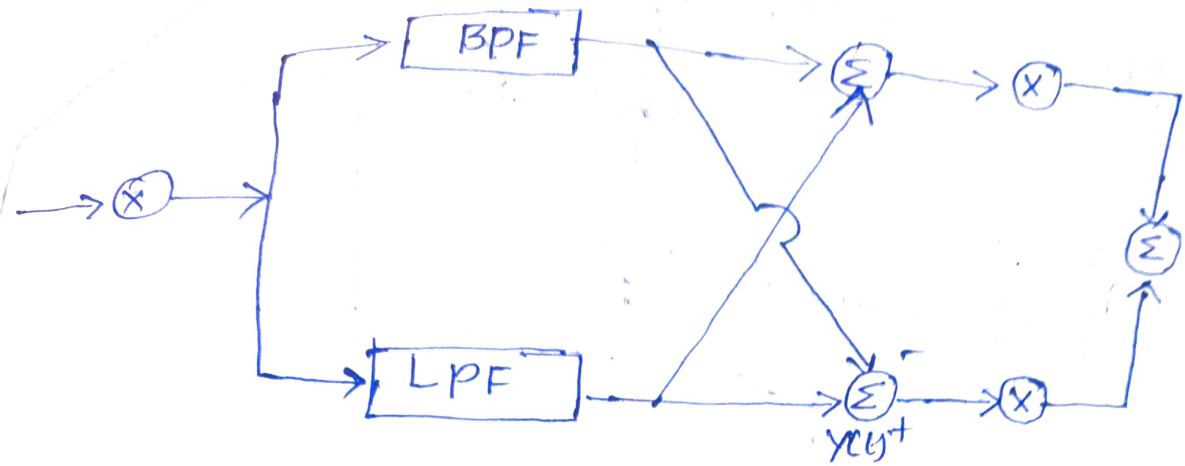
MSK transmitter :-



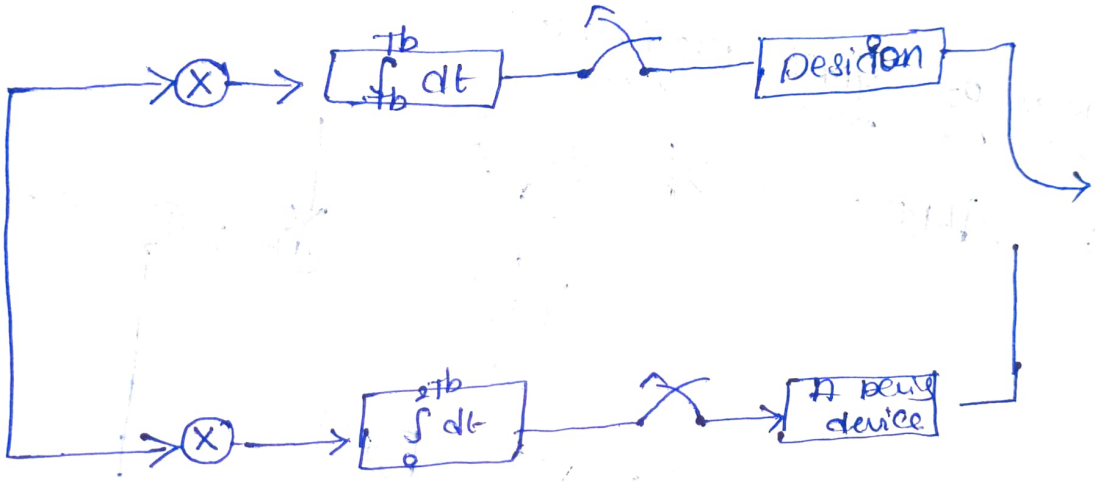
MSK Receiver



Transmitter :-



MSK Receiver :-

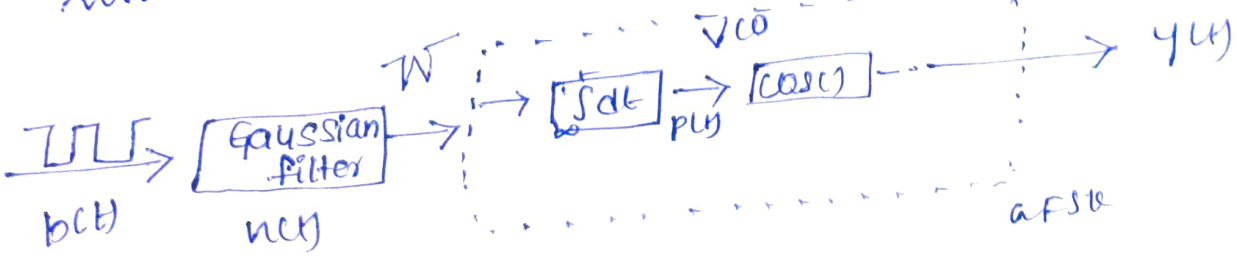


Transmitter

Gmsk Receiver :-

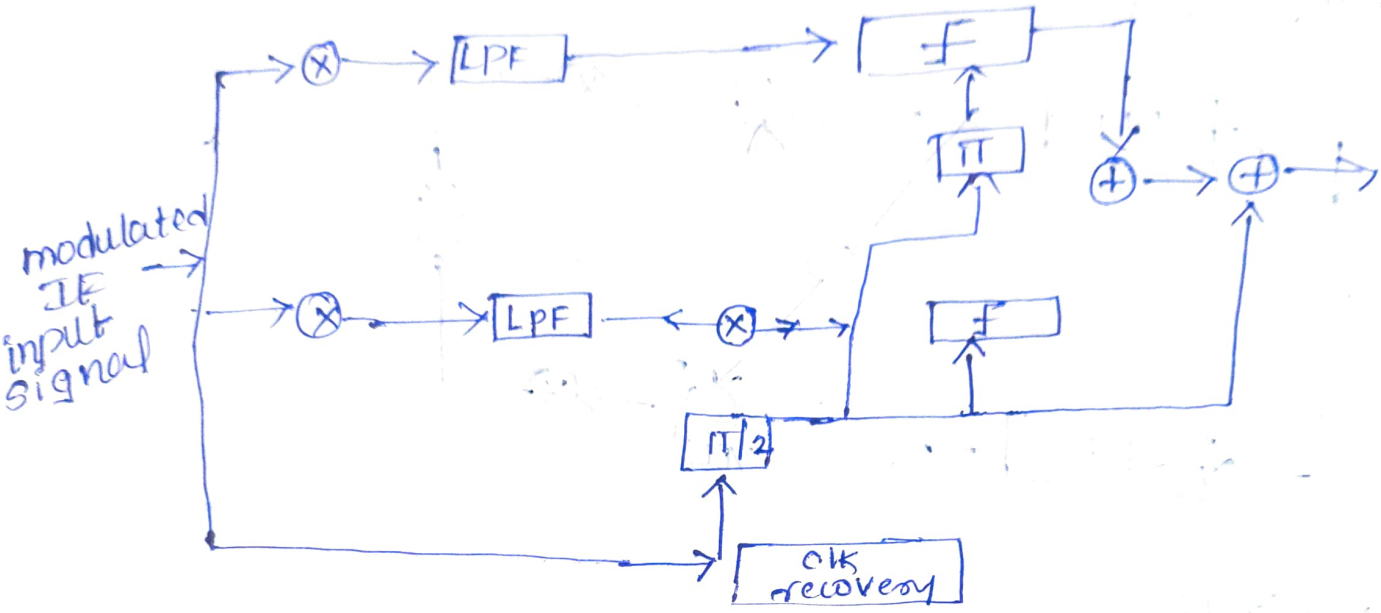
NRZ Data → Gaussian LPF → Fm Transmitter → Gmsk.

Gmsk Receiver :-

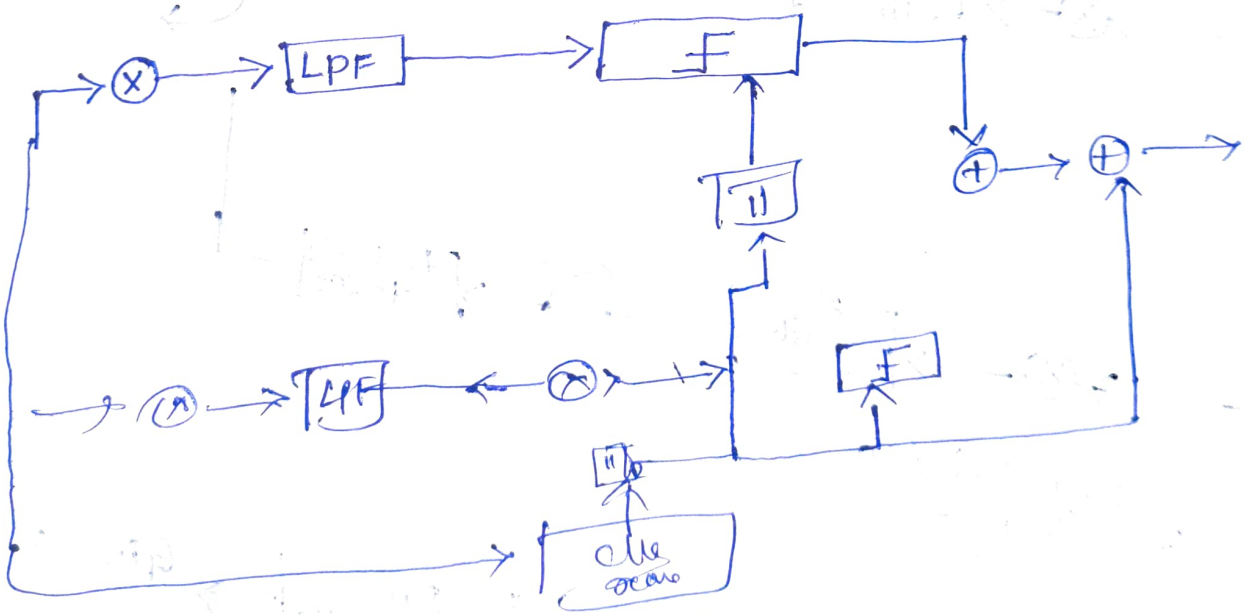


$$p(t) = h(t) \otimes b(t)$$

Block diagram of GMSK Receiver :-



Block diagram of GMSK Receiver :-



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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024
List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. T. Kavitha

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : B		**Course Handling Faculty :** Dr. C.R. Bharathi		
1.	VTU19899	GAJJALA PRANAY KUMAR REDDY	C	AB
2.	VTU20126	VAKA KRISHNA KANTH	C	AB
3.	VTU19884	SURAPUREDDY VENKATA SURENDRA REDDY	C	AB
4.	VTU20891	PEDDAPOTHULA VENKATA HEMANTH	C	AB
5.	VTU20915	KARUTURI VENKATA KRISHNA SAIPAVAN	C	AB
6.	VTU20926	KANIYAMPATI VEERA HEMANTH KUMAR	C	1
7.	VTU21025	DEVAPURE RAHUL	C	AB
8.	VTU21153	SAIKRISHNA N	C	09
9.	VTU20784	YARRAM MUSALA REDDY	C	AB
10.	VTU20817	UMMINENI KARTHEEK	C	AB
11.	VTU20707	AKUNURI BAJI BABU	C	AB
12.	VTU21024	M HRUSHIKESH BHARADWAJ	C	AB
13.	VTU24104	KOSURU LALITH SAI	C	AB
14.	VTU21052	BELLAMKONDA PHANEENDRA	C	00

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Lagging of solving the problems.
- The students were not writing the derivations properly.
- Few missed the classes at the beginning. They joined the classes after few weeks.

Action Planned:

- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test and special class for slow learners.

C. R. Bharathi
Faculty

Course Coordinator

HOD/ECE

SLOW LEARNERS ATTENDANCE

CLASS: SEM.: COURSE:

Roll No. VTU	Name	Month / Date / Hour	← AUGUST → 14	21	28
			3	3	3
19899	G. Pranay Kumar Reddy		1	2	3
19900	L. Narendra Reddy		1	2	3
20126	Vala Krishnakanth		1	2	3
21026	C. Yashwanthi		1	A	2
19884	S. Venkata Surendra Reddy		1	2	3
20891	D. Venkata Hemanth		A	1	2
20915	K. Venkata Krishna Saiparam		1	2	3
20926	K. Vera Hemanth Kumar		1	2	3
21025	D. Rahul		1	2	3
21153	Sai Krishna .N.		1	2	3
20193	K. Sai Sujitha		1	A	2
20784	Y. Musala Reddy		1	2	3
20817	U. Karthik		1	2	3
20707	A. Baji Babu		1	2	3
21024	M. Hrushikesh Bharadwaj		1	2	3
21031	S. Lokesh Reddy		1	2	A
24104	K. Lalithsai		1	2	3
21052	B. Phanendra		1	2	3
23744	Vignaeshwar .S		1	2	3

G. Praneeth
VTU19899

SLIP TEST

PART-A

1) Write the types of hand off.

Ans: TYPES OF HANDOFF ARE :

(i) HARD HANDOFF :

Mobile monitors BS and new cell is allocated to a call with strong signal.

(ii) SOFT HAND OFF :

MS with 2 or more calls at the same time and find which is the strongest signal BS, then MSC automatically transfers the call to that BS.

2. Calculate the Brewster Angle for a wave impinging on ground having a permittivity of $\varepsilon_r = 3.9$

Ans: Brewster angle = $\sin\theta_B$

$$= \sqrt{\frac{\varepsilon_r - 1}{\varepsilon_r^2 + 1}}$$

$$= \sqrt{\frac{3.9-1}{(3.9)^2+1}} = \sqrt{\frac{2.9}{15.21+1}}$$

$$\boxed{\sin\theta_B = \sqrt{0.204}}$$

3) Write the advantages of digital over analog m

Ans:
(i) Spectral Efficiency is high.
(ii) Adjacent Channel Interference is low.
(iii) Greater noise immunity.
(iv) Robustness to channel impairments.
(v) Easier multiplexing of various forms of inform and Greater security.

4) What is nonlinear modulation?

Ans: In nonlinear modulation, the amplitude of the carr is constant regardless of the variation in the modulating signal.

5) What are the techniques used to improve the recieve signal quality?

Ans: (i) Equalization.
(ii) Diversity and Channel coding.

6) What are the factors used in adaptive algorithm

Ans: (i) Rate of convergence.
(ii) Misadjustment
(iii) Computational Complexity and numerical properties.

PART-B

A MIMO system with N transmitter and M receiver antenna using diversity at transmitter and receiver end. Find the capacity of the system. If the channel matrix is $H\begin{pmatrix}1&0\\0&1\end{pmatrix}$ and the signal to noise ratio is 251

s:

The capacity of the 2x2 MIMO channel is calculated using the below formula

$$C = B \log_2 \left[\det \left(I_m + \frac{P_s}{N} H H^* \right) \right] \text{ bps}$$

where I_m is a 2x2 identity matrix $P_s/N = S/N$

The calculate the capacity

$$C = 10^6 \log_2 \left[\det \begin{pmatrix}1&0\\0&1\end{pmatrix} + 251 \begin{pmatrix}1&0\\0&1\end{pmatrix} \times \begin{pmatrix}1&0\\0&1\end{pmatrix} \right]$$

$$= 10^6 \log_2 \left[\det \begin{pmatrix}1&0\\0&1\end{pmatrix} + 251 \begin{pmatrix}1&0\\0&1\end{pmatrix} \right]$$

$$= 10^6 \log_2 \left[\det \begin{pmatrix}1&0\\0&1\end{pmatrix} + \begin{pmatrix}251&0\\0&251\end{pmatrix} \right]$$

$$C = 10^6 \log_2 \left[\det \begin{pmatrix}252&0\\0&252\end{pmatrix} \right]$$

[det → determinant of matrix H]

$$C = 10^6 \log_2 [252(252) - 0]$$

$$= 10^6 \log_2 63504$$

Applying the change of base formula

$$C = \frac{10^6 \log_{10}(63504)}{\log_{10} 2} = 10^6 \times 15.955$$

$$\boxed{C = 16 \text{ Mbps}}$$

2) Derive the expression for free space propagation path loss model.

$$P_r(d) = \frac{P_t G_t G_r \lambda^2}{(4\pi)^2 d^2 L} \quad \text{---(1)}$$

where P_t → Transmitted power.

$P_r(d)$ → Received power which is the function of the T-R separation

G_t → Transmitted antenna gain

G_r → Receiver antenna gain

d → T-R separation distance in meters.

L → System loss

λ → wavelength in meters.

P_t and P_r → Same units (watts)

G_t and G_r → Dimensionless quantities.

If $L = 1$, no loss

$L \geq 1$, System loss not related to propagation model.

$L \leq 1$, Micellaneous loss - occur due to Transmission line attenuation, filter losses and antenna losses.

In Equation 1, received power is inversely proportional to the square of the distance.

Received power decays by increasing the distance.

Path loss in free space model is given by,

* $PL\,(dB) = 10 \log \frac{P_t}{P_r}$

From equation 1

* $PL\,(dB) = 10 \log \frac{P_t}{P_r} = -10 \log \left[\frac{G_t G_r \lambda^2}{(4\pi)^2 d^2} \right]$

Assume antenna gains are unity.

* $PL\,(dB) = 10 \log \frac{P_t}{P_r} = -10 \log \left[\frac{\lambda^2}{(4\pi)^2 d^2} \right]$

3) Assume four branch diversity is used, where eac branch receives an independent Rayleigh fading signal. the average SNR is 20dB. Determine the probability tha the SNR will drop below 10dB. Compare this with the cas of a single receiver without diversity.

Ans For this problem the specified threshold $\gamma = 10dB$, $\Gamma = 20dB$ and there are four branches.

Thus $\frac{\gamma}{\Gamma} = 0.1$

$P_4(10dB) = (1 - e^{-0.1})^4$

$= 0.000082.$

$P = (1 - e^{-\gamma/\Gamma})^m$ —①

When diversity is not used ① may be evaluated using $M = 1$.

$$P_1(10dB) = (1 - e^{-0.1})^1 = 0.095.$$

Notice that without diversity the SNR drops below the specified threshold with a probability that is three orders of magnitude greater than if four branch diversity is used.

K. Lalithsai
VTU 24104

SLIP TEST

PART - A

1) What are the propagation mechanisms of EM waves?

Ans: The four propagation mechanisms of EM waves are

* Free space propagation
* Reflection
* Diffraction
* Scattering

2) What is scattering?

Ans: When a radio wave impings on a rough surface, the reflected energy is spread out in all directions due to scattering.

3) Explain the following terms a) Baud rate b) Bit rate

Ans:
* Baud rate:

Speed at which symbols are transmitted in a digital communication system, i.e. no. of symbols / second

* Bit rate:

Speed at which data bits is transmitted in a digital communication system, i.e. no. of bits / second.

4) What are the features of $\pi/4$ Quadrature Phase Shift Keying?

Ans:
* It uses non coherent detection which greatly simplifies the reciever design.
* In the presence of multipath spread and fading, $\pi/4$ QPSK performs better than QPSK.

5) What is equalizer?

Ans: The device which equalizes the dispersive effect of a cha is referred to as an equalizer.

6) What are the operating modes available in an adaptive equalizer?

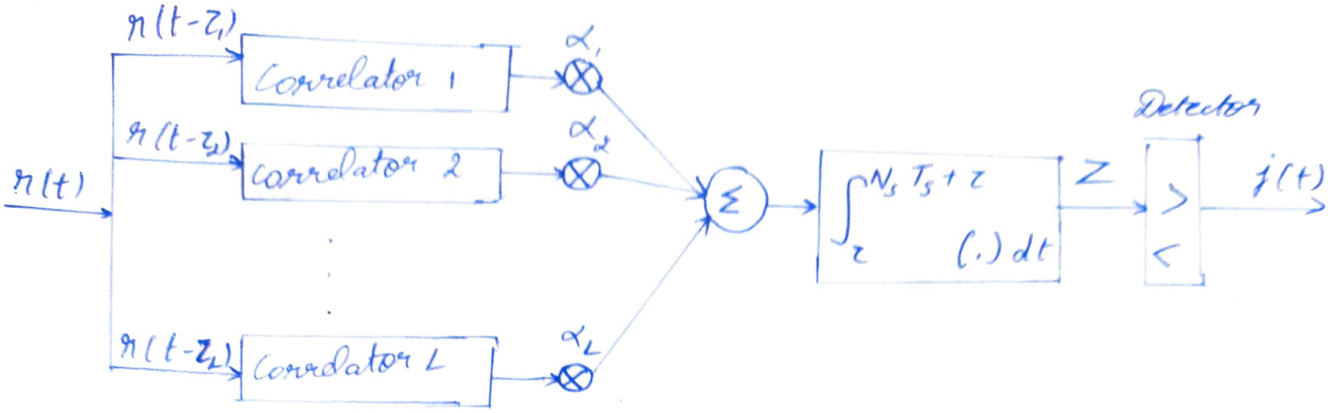
Ans: Training and tracking modes.

PART-B

1) With relevant diagrams explain Rake receiver. Also discuss how time diversity is achieved in a CDMA technique using Rake receiver.

Ans: In CDMA spread spectrum systems, the chip rate is typically much greater than the flat-fading bandwidth of the channel. Whereas conventional modulation techniques require an equalizer to undo the intersymbol interference between adjacent symbols, CDMA spreading codes are designed to provide very low correlation between successive chips. Thus, Propagation delay spread in the radio channel merely provides multiple versions of the transmitted signal at the receiver.

If these multipath components are delayed in time by more than chip duration, they appear like uncorrelated noise at a CDMA receiver, and equalization is not required. The spread spectrum processing gain makes uncorrelated noise negligible after dispreading.



However, since there is useful information in the multipath components, CDMA receivers may combine the time delayed versions of the original signal transmission in order to improve the SNR at the receiver. A RAKE receiver does just this - it attempts to collect the time-shifted versions of the original signal by providing a separate correlation receiver for each of the multipath signals.

Each correlation receiver may be adjusted in time delay, so that a microprocessor controller can cause different correlation receivers to search in different time windows for significant multipath. The range of time delays that a particular correlator can search is called a search window.

The RAKE receiver is essentially a diversity receiver designed specifically for CDMA, where the diversity is provided by the fact that the multipath components are practically uncorrelated from one another when their relative propagation delays exceed a chip period.

2) Determine the proper spatial sampling interval required to make small-scale propagation measurements which assume that consecutive samples are correlated in time. How many samples will be required over 10m travel distance if $f_c = 1900$ MHz and $v = 50$ m/s. How long would it take to make measurements, assuming they could be made in real time from a moving vehicle? What is the Doppler spread BD for the channel?

For correlation, ensure that the time between samples is equal to T_c. Use the smallest value of T_c for conservative design coherence

Time $T_c = \frac{9}{16\pi f_m} = \frac{9\lambda}{16\pi v f_c} = \frac{9 \times 3 \times 10^8}{16 \times 3.14 \times 50 \times 1900 \times 10^6}$

$$T_c = 565\,\mu s$$

Taking time samples at less than half T_c, at 282.5 μs corresponds a spatial sampling interval of

$$\Delta x = \frac{v T_c}{2} = \frac{50 \times 565\,\mu s}{2} = 0.014125\ m = 1.41\ cm.$$

Therefore, the no. of samples required over a 10m travel distance is

$$N_s = \frac{10}{\Delta x} = \frac{10}{0.014125} = 708 \text{ samples}.$$

The time taken to make this measurement is equal to $\frac{10\,m}{50\,m/s} = 0.2\,s$

The doppler spread is

$$BD = f_m = \frac{v f_c}{c} = \frac{50 \times 1900 \times 10^6}{3 \times 10^8} = 316.66\ Hz.$$

e spectrum of a SISO communication channel is 1MHz and the signal to noise ratio is 24 dB using Shannon formula $C = B \log_2 [1 + S/N]$ (bits/sec) Find the channel capacity.

$$S/N_{dB} = 10 \log_{10} (S/N)$$

Therefore

$$24 = 10 \log_{10} S/N$$

$$2.4 = \log_{10} (S/N)$$

Applying the inverse function for the log function, the exponential function base 10 to both sides is expressed as

$$\frac{S}{N} = 10^{2.4} = 251.$$

Hence the capacity is calculated as

$$C = 1MHz \log_2 (1 + 251) = 10^6 \log_2 (252)$$

$$\log_2 (2) = \frac{\log_{10} (2)}{\log_{10} (2)}$$

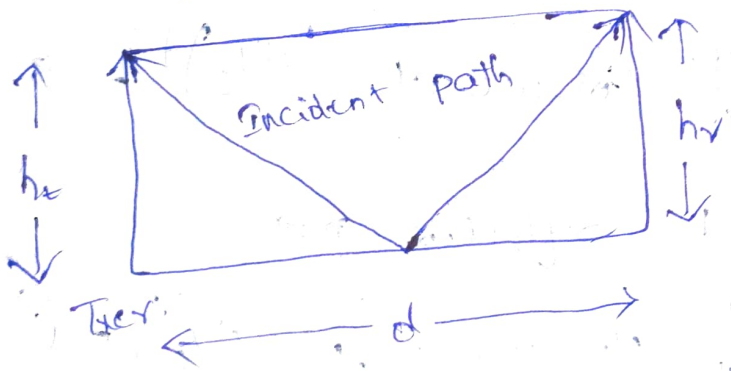
$$= 10^6 \frac{\log_{10} (2)}{\log_{(10)} 2}$$

$$= 10^6 \times 7.977 \approx 8 \text{ MBPS}.$$

Slip test

Two ray model:

* It has a both line of sight or direct sight as well as reflected path.
* It is based on geometic optics.
* It provides accurates results for large scale propogation model.



Analysis

* Tx, Rx seprates distance in km.
* Earth is assumed to be flat.
* Electric field. $E_{tot} = E_{los} + E_g$ — (1).
* The free space propogation of electric field of distance 'd'.

$$\sqrt{(ht - hv)^2 + d^2}$$

$$\sqrt{(ht + hv)^2 + d^2} \quad \text{--- (6)}$$

$$d'' - d' \quad \text{--- (7)}$$

$$= \sqrt{ht + hv + d^2} - \sqrt{(ht - hv)^2 + }$$

$$\Delta = \frac{2ht + hv}{d}$$

Phase difference

$$\phi = \frac{2\pi \Delta}{\lambda} \quad \text{--- (9)}$$

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : C		**Course Handling Faculty :** Dr.G.Aloy Anuja Mary		
1.	VTU19767	Addanki John Sujith	C	5
2.	VTU20656	Gajjala Raju	C	4.5
3.	VTU20759	Yaddanapudi Venkata Sri Harsha	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Attendance Percentage is Poor
- Not Presented the concepts and Problems properly

Action Planned:

- To conduct Special class till University Exams
- To inform the less Attendance percentage and test marks to the respective mentors
- To handle Previous Year University Papers about how to present the answers in exam
- To conduct slip test from the Question Bank

Faculty **Course Coordinator** **HOD Sign**

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : C		**Course Handling Faculty :** Dr.G.Aloy Anuja Mary			
1.	VTU19767	Addanki John Sujith	0	15.5	D
2.	VTU20656	Gajjala Raju	5.5	11	D
3.	VTU20759	Yaddanapudi Venkata Sri Harsha	0.5	AB	NE

Action Taken:
Conducted special class and slip test.
Instructed the students to present the answers in a legible way.

Improvements Observed:
Two students shown their improvement because of discussion of university qn papers & important questions during the special class.

Faculty **Course Coordinator** **HOD Sign**

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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table (20.07.2023-25.10.2023)

Course Code and Title : 10211EC112 / Wireless Communication

Section : C

Course Coordinator : Dr. Kavitha T

S. No	Date	Timing
1	20.07.2023	4.45 pm – 5.35 pm
2	22.08.2023	4.45 pm – 5.35 pm
3	23.08.2023	4.45 pm – 5.35 pm
4	07.09.2023	4.45 pm – 5.35 pm
5	14.09.2023	4.45 pm – 5.35 pm
6	21.09.2023	4.45 pm – 5.35 pm
7	04.10.2023	4.45 pm – 5.35 pm
8	11.10.2023	4.45 pm – 5.35 pm
9	18.10.2023	4.45 pm – 5.35 pm
10	25.10.2023	4.45 pm – 5.35 pm

Course Coordinator

HOD/ECE

Slow learner's special class

CLASS: SEM: COURSE:

Roll No	Name	Date	20/7	22/8	23/8	7/9	14/9	21/9	4/10	11/10
		Hour	3	7	7	7	7	7	7	7
19767	Addanki John Sujith		1	2	3	4	5	6		
20057	Gajjala Raju		1	2	3	4	5	6		
20759	Venkata Sri Harsha		A	A	A	A	A	A	A	A

Topics Handled :-

1. Cellular concepts, Reflection
2. Diffraction, fading concepts
3. Offset QPSK, GMSK
4. Spread Spectrum techniques
5. Equalization, Diversity
   Rake Receiver
   Multiple Access techniques
   CSMA, scheduling
   UMTS, wimax
   LTE, IMS Architecture

P. Deepa

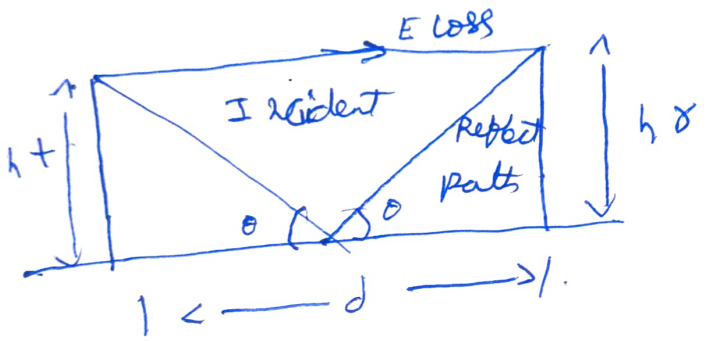
Wireless Communication :- [redacted] :- O.V. Jaswanth
VTU19639.

Two Ray Model :-

3/3 d

=> LOS (Line of sight)
=> Reflected spot.
=> Geometric optics

* Provide accurate result for Landscape propagation. Distance interface of terms.



$$E_{tot} = E_{los} + E_g \quad \rightarrow (1)$$

$$E(d,t) = \frac{\epsilon_0 d_0}{d} \cos\left(\omega_c\left(t - \frac{d}{c}\right)\right) \quad \rightarrow (2)$$

Note:- * $d > d_0$
* $d_0 > d_f$

$$d > d_0 > d_f$$

=> I E field due to lose path

$$E(d', t) = \frac{\epsilon_0 d_0}{d_1} \cdot \cos\left(\omega_c\left(t - \frac{d}{c}\right)\right) \rightarrow (3)$$

$$E(d'', t) = \frac{\epsilon d_0}{d''} \cos\left(\omega_c\left(t - \frac{d'}{c}\right)\right) \rightarrow (4)$$

21/7/23

3/3

P. Lokeswara Reddy
VTU÷ 24098

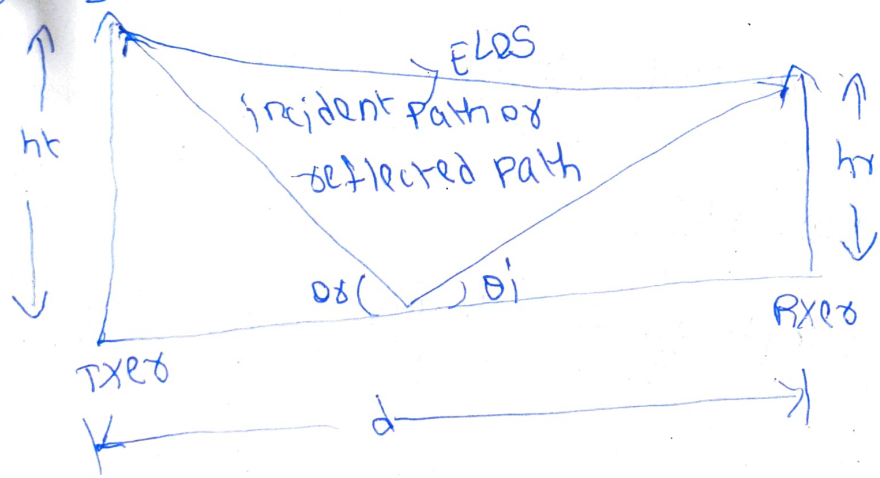
Two ray model (or) Ground wave propogation

*) It has both line of sight or direct straight as well as reflected path.

*) It is based on geometric optics.

*) It provides accurated result for large scale propogation models.

$E_{tot} = E_{LOS} + E_g$



Analysis ÷

Assumption ÷

1) TX, RX separation distance is few ten kilometers.

*) Earth is assumed to be flat.

*) Electric field

$$E_{tot} = E_{LOS} + E_g \quad \rightarrow (1)$$

*) The free space propogation of electric field distance 'd' is given by

$$E_{LOS} = E_0 \cos[\omega c(t - \frac{d}{c})] \rightarrow (2)$$

They are three types of difference

*) path difference
*) phase difference
*) Time difference

E field due LOS path is given by

$$E(d', t) = \frac{E_0 d_0}{d'} \cos\left[\omega_c\left(t - \frac{d'}{c}\right)\right] \rightarrow (3)$$

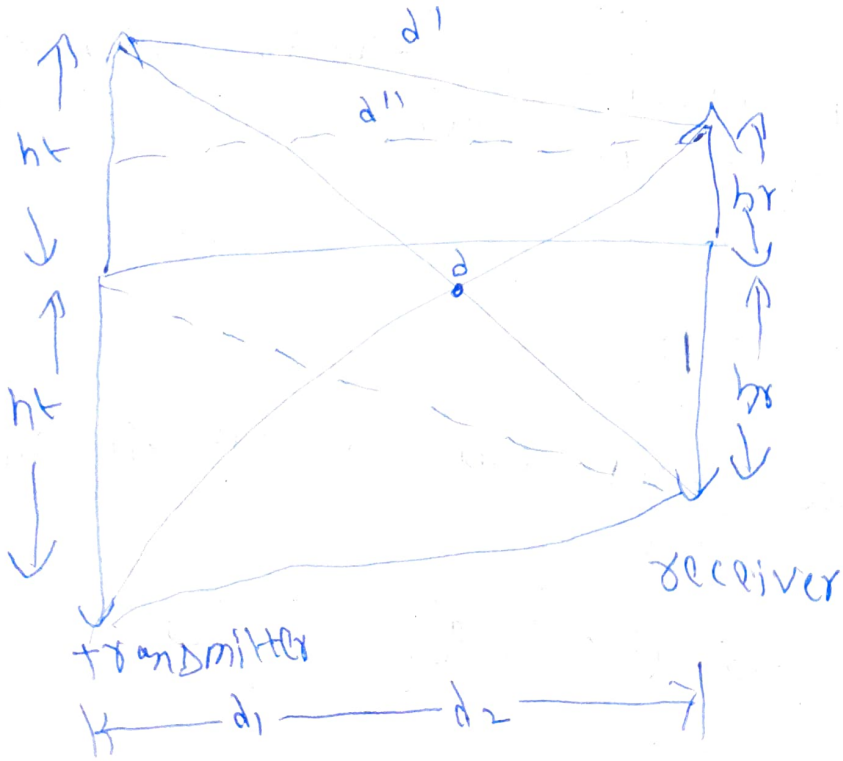
E field due to reflected path is given by

$$E(d'', t) = \frac{E_0 d_0}{d''} \cos\left[\omega_c\left(t - \frac{d''}{c}\right)\right] \rightarrow (4)$$

~~$E_{LOS} = E$~~ $E_{tot} = E_{LOS} + E_g$

$$E_{tot} = \frac{E_0 d_0}{d'} \cos\left(\omega_c\left(t - \frac{d'}{c}\right)\right) (-1) \frac{E_0 d_0}{d''} \cos[\omega_c(t$$

*) Path difference



$d'' - d' \rightarrow (7)$

$\sqrt{(h_t + h_r)^2 + d^2} - \sqrt{(h_t - h_r)^2 + d^2} \rightarrow (8)$

$= \frac{2h_t h_r}{d}$

Phase difference

$\theta\Delta = \frac{2\pi\Delta}{\lambda} \rightarrow (9)$

$\lambda = \frac{c}{f} \rightarrow (10)$

$\theta\Delta = \frac{2\pi\Delta}{\lambda}$

$\theta\Delta = 2\pi\Delta f \rightarrow (11)$

$\omega = 2\pi f \rightarrow (12)$

$\theta\Delta = \Delta\omega/c \rightarrow (13)$

3) Time difference

distance = velocity × time $\rightarrow (14)$

$\Delta = c \times Cd \rightarrow (15)$

$Cd = \frac{\Delta}{c} \rightarrow (16)$

$\theta\Delta = \frac{2\Delta\pi}{\lambda} \rightarrow (17)$

$Cd = \frac{\theta\Delta\lambda}{2\pi c}$ (or) $\frac{\theta\Delta}{2\pi f} \rightarrow (18)$

$Et_{ot} = \frac{d''}{c}$

$E_{tot}(d, d''/c) = E_0$

$E(d,t) = \frac{E_0 d_0}{d} [\cos\omega c(t - \frac{d}{c}) \rightarrow (1)$

$E_0 d_0 [\cos(\omega c(t - \frac{d''}{c})] \rightarrow (2)$

$$E(d'', t) = \frac{E_0 d_0}{d''} \left[\cos\left(\omega_c\left(t - \frac{d''}{c}\right)\right)\right] \rightarrow (19)$$

$$E_{tot}(d, d''/c) = \frac{E_0 d_0}{d'} \left[\cos\left(\omega_c\left[\frac{d''}{c} - \frac{d'}{c}\right]\right) - \frac{E_0 d_0}{d''}\right.$$

$$\left.\frac{d''}{c} - \frac{d''}{c}\right] \rightarrow (19)$$

$$\frac{E_0 d_0}{d'} \left[\cos\left(\omega_c\left(\frac{d}{c}\right)\right) - \frac{E_0 d_0}{d''}\right. \rightarrow (20)$$

$$|E_{tot}| \simeq \left|\frac{E_0 d_0}{d'}\right| \simeq \left|\frac{E_0 d_0}{d''}\right| \simeq \left|\frac{E_0 d_0}{d}\right| \rightarrow (21)$$

$$\sqrt{\cos^2\theta + \sin^2\theta} \rightarrow (22)$$

$$\frac{E_0 d_0}{d} = \sqrt{\cos^2\theta + 1 - 2\cos\theta + \sin^2\theta} \rightarrow (23)$$

$$\boxed{\cos^2\theta + \sin^2\theta = 1}$$

$$\frac{E_0 d_0}{d} = \sqrt{2(1 - \cos\theta)} \rightarrow (24)$$

$$\frac{E_0 d_0}{d} = E_{tot} = \frac{E_0 d\theta}{d} \rightarrow (25)$$

$$E_{tot} = \frac{4\pi E_0 d_0 h_t h_r}{d^2 \lambda} \rightarrow (27)$$

$$\boxed{E_{tot} \simeq \frac{\chi}{d^2}} \rightarrow (28)$$

$$P_r = \frac{P_t G_t G_r h_t^2 h_r^2}{d^4}$$

$$\boxed{P_L(dB) = 40\log(d) - 10\log G_t + 10\log G_r + 20\log h_t + 20\log h_r}$$

Vel

model (or) ground wave propagation

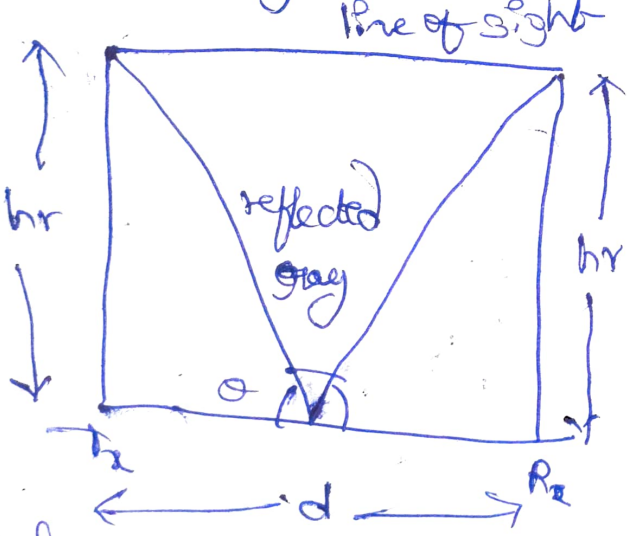
① Sai Siva Ganesh (3/3)

VTU24029

Ans:- ↳ It has the both line of sight and reflected wave.

↳ It depend on the geographical path

↳ It provide the accurate results for large scale propagation modes.



Analysis

① Transmitter and receiver are separated with focus 10's of km

② let's assume earth is flat

③ total electric field power

$$E_{tot} = E_{LOS} + E_g \quad \text{—— ①}$$

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : D		**Course Handling Faculty :** Dr. KALPANA DEVI P		
1.	VTU19160	LOKESH B	C	AB
2.	VTU19002	Y JANAKI RAMAIAH	C	AB
3.	VTU19508	P .AKSHAY KUMAR	C	3
4.	VTU20717	PURNA KISHORE M	C	5
5.	VTU20939	K .RAMA KRISHNA	C	7
6.	VTU20965	SHAIK K KAIF	C	5
7.	VTU20981	CH.PAVAN KUMAR	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- Lagging of solving the problems.
- The students were not writing the derivations properly.

Action Planned:

- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test and special class for slow learners.

Faculty **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : D		**Course Handling Faculty :** Dr. KALPANA DEVI P			
1.	VTU19160	LOKESH B	AB	2	D
2.	VTU19002	Y JANAKI RAMAIAH	0	19	D
3.	VTU19508	P .AKSHAY KUMAR	AB	1	D
4.	VTU20717	PURNA KISHORE M	AB	6	D
5.	VTU20939	K .RAMA KRISHNA	3	6	RA
6.	VTU20965	SHAIK K KAIF	10	18	D
7.	VTU20981	CH.PAVAN KUMAR	4	AB	D

Action Taken:

1. Conducted Special classes
2. Conducted test
3. Revision was provided to solve the problems and derivations

Improvements Observed:

1. Six students passed in the end sem exam. Ramakrishna alone got failed.

Faculty **Course Coordinator** **HOD/ECE**

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R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Slow Learners Time Table

Course Code and Title : 10211EC112 / Wireless Communication TTS No. 2808

Course Handling Faculty : Dr.P.Kalpana Devi Sec: D

Course Category : Programme Core

Date	Activity
25.10.23	Unit -1 Problem Solving
26.10.23	Slip Test - Problems in Unit -1
30.10.23	Test – 1 Discussion
31.10.23	Problems Discussion
01.11.23	Test- 2 Discussion
02.11.23	Test- 3 Discussion

Faculty Incharge Course Coordinator HOD

Slow learners.

CLASS: SEM.: COURSE:

	Roll No	Name	Month	Sep		Oct					
			Date	19	26	17	18	19	23		
			Hour	8	7	7	7	7	7		
1	19020	B. Lokesh.		P	P	P	P	P	P		1
2	19002	Jasaki Ramiah		P	P	P	P	P	P		2
3	20714	Puna Krishora		P	P	P	P	P	P		3
4	20939	Rama Krishna		P	P	P	P	P	P		4
5	20981	Ch. Pavan Kumar		P	P	P	P	P	P		5
6											6
7											7
8											8
9											9
10		Valper									10
11		Faculty									11
12		Sign.									12
13			CC								13
14			Sign.								14
15											15
16		Topics.									16
17	19/9/23	Unit-3 revision									17
18	26/9/23	Slip test									18
19	17/10/23	Test-3 revision.									19
20	18/10/23	Problems Discussion									20
21	19/10/23	Slip test & QP Discussion.									21
22	19/10/23	Discussion.									22
23											23
24											24
25											25
26											26
27											27
	No. of Absentees										
	Initials										

t :- wireless commun. Re-Test - III
ation

Name :- K. Rama krishna
No :- Vtu 20939

Part - A

A wirless technology that uses multiple transmitters and recivers to transfer more data at the same time.

capaicty in CDMA can be increased by

i) Quiet periods during speech transmission is shared by many users

ii) Fixed le data rate.

iii) Softy capacity

iv) Error correction coding used.

Number of Channels

$$N = \frac{B_t - 2B}{B_c}$$

$$= \frac{12.5 \times 10^6 - 2 \times 10 \times 10^3}{30 \times 10^3}$$

N = 416 Channels

These challenges inculde Specturm Allocation

high - frequncy Band (mmwave) Infastructure investement

Regulatory and policy challages Networks security concerns

Equipment and vendor Diveristy Roaming and inter connection

Energy efficiney convrage in Rural areas Helath and enviormental

Conerns Transistion from Legacy Networks content and services

Standardzition and compatibity.

WCDMA differes from other 3G technologies related to CPMA-

based high data rates gerater capacitiy improved Vioce

cvuality gtto global standrd board band data and evolva

bility It's important to note that while WCDA was

a major steps forward in 3G mobile technology.

Part-B

Synchronizations:-

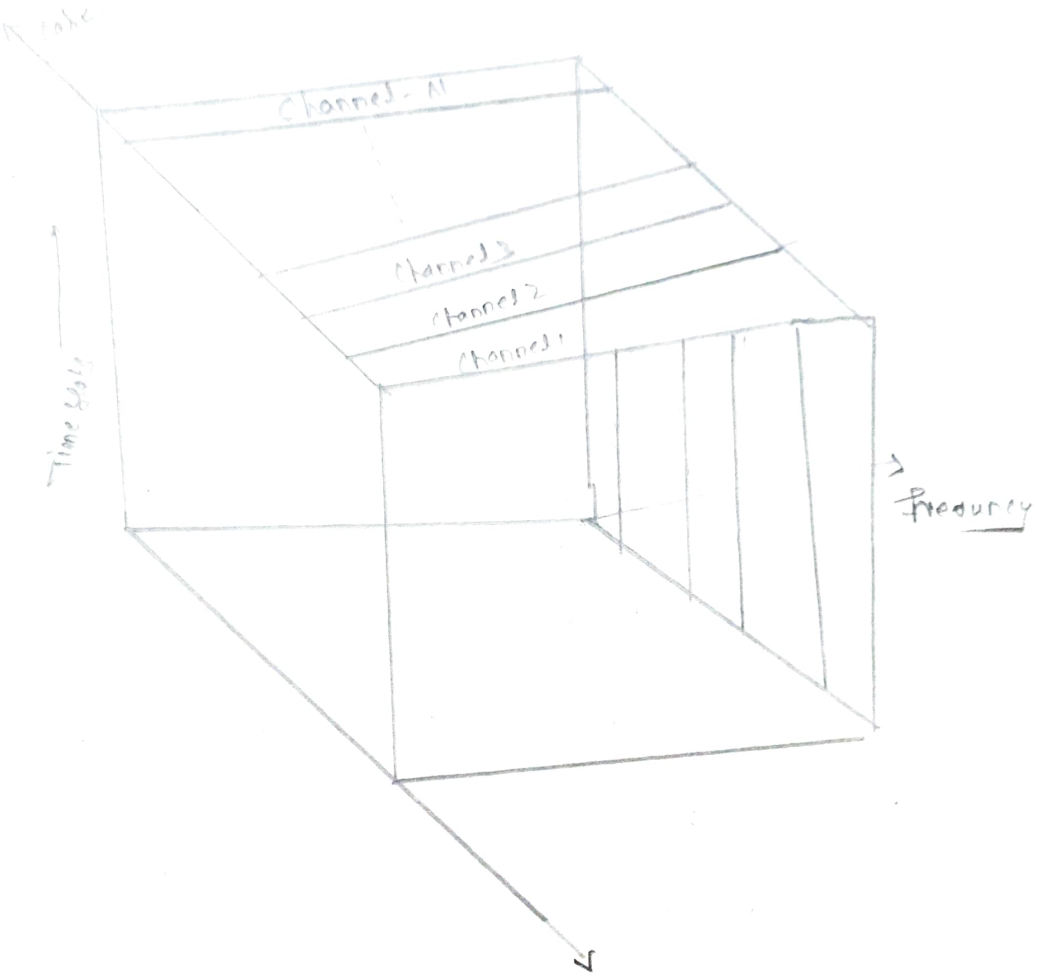
All users in the TDMA system are synchronized to the frame structure. This ensures that every user knows when to transmit and data receive data.

Time slot Assignments:-

users are allocated specific time slots within each frame for transmitting there data the allocation is usually controlled by a central entity like a based station in cellular working.

Data transmission:- During their allocated time slots users takes turns and each user transmits in their designated time slot. this ensures that multiple users can share the same frequency band with out interfering each other.

Recepition:- users also listen during their designed time slots for data from them users since each user known the frame structure.

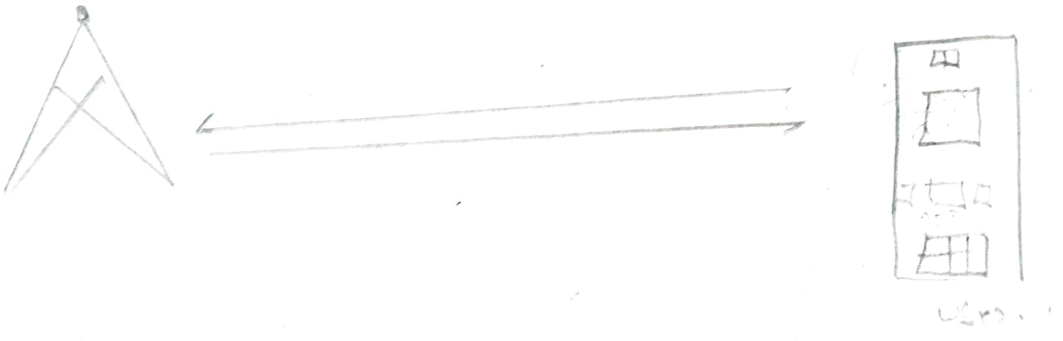


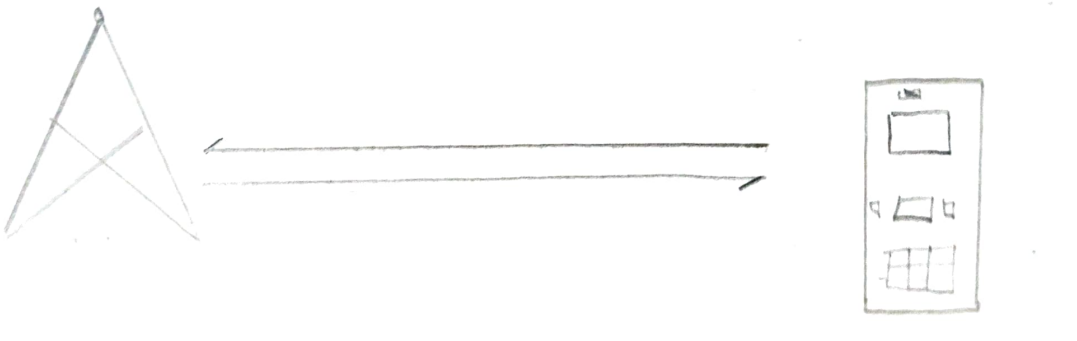
=> multiple users In this example we have three users but multiuser MIMO system but multiuser mimo system can handle more users as well.

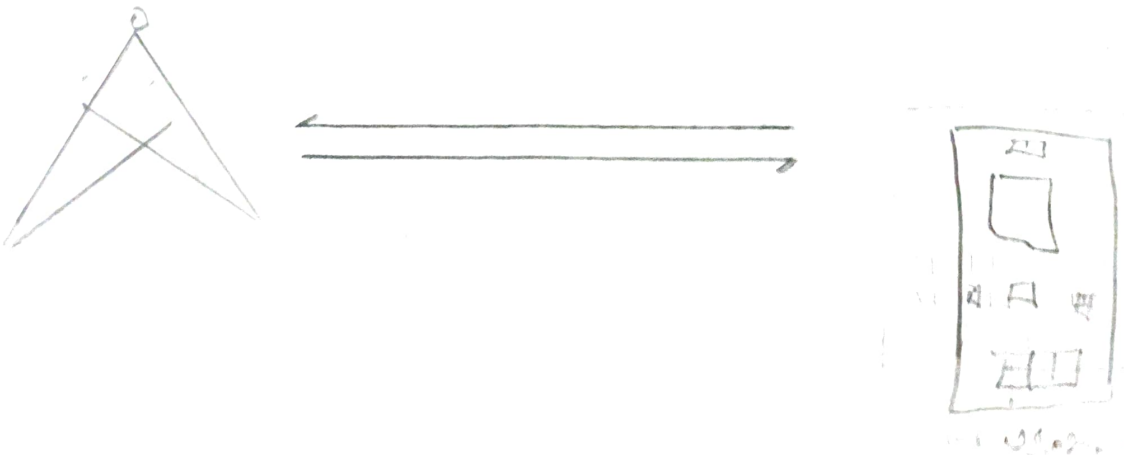
=> multiple Antennas Each user and the base station have multiple antennas which allows for spatial processing

=> Pre coding and Beam forming :- Signal Processing techniques like Pre coding and to optimize singal transmission and reception.

In Summary a multi user MIMO system allows multiple users to transmit and receive data simultaneously making more efficient use of the wireless spectrum and improving communication quality it, key technology in modern wireless communication system such 4G and 5G networks.







10)

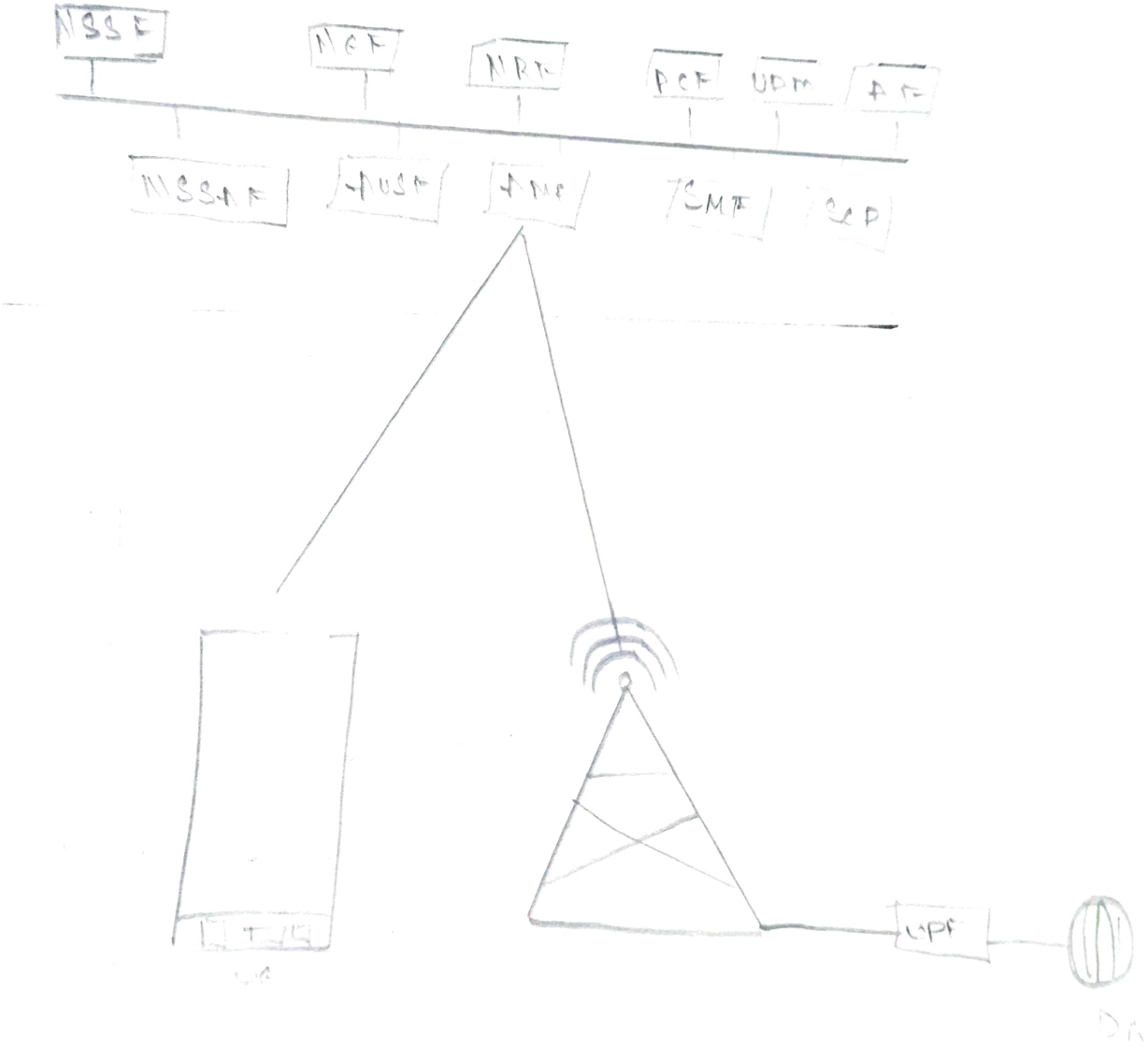
⇒ User Equipment the devices like smart phones tables and IoT devices that connect to the 5G network. they communicate with the network infrastructure using radio waves.

⇒ The RAN includes based stations that connect UEs to the core Network It uses advanced technologies like massive MIMO and beam forming to improve data rates and coverage.

⇒ Edge computing 5G networks in operate edge computing to reduce computing latency by processing data closer to the sources Enabling applications like augmented reality and autonomous vehicles.

⇒ In addition to traditional cell towers 5G networks use small cell such as micro cells and pico cells to provide high density coverage in urban areas.

⇒ Support a wide range of applications from mobile broad band to critical IoT and mission-critical services.



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
WINTER 2022-2023

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr.I.SHEIK ARAFAT

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : E		**Course Handling Faculty : Dr.I.SHEIK ARAFAT**		
1.	VTU19156	REDROWTHU DURGA PRASAD	C	7
2.	VTU19316	KOTHAPALLI CHANDRA NITHIN	C	2
3.	VTU19435	DHENUVAKONDA MADHUGNA KOUSIK	C	AB
4.	VTU20658	ALA PRATHYU SAI	C	AB
5.	VTU20678	GUBBALA V V DURGA RAGHAVA AKHIL	C	9
6.	VTU20733	VULUVALA PAVAN KUMAR REDDY	C	AB
7.	VTU20740	ABHIRAJ KUMAR SINGH	C	AB
8.	VTU20778	NAVEEN KUMAR	C	AB
9.	VTU20924	MULE MADHAVA REDDY	C	4
10.	VTU24102	SHUBHAM GOLDER	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

They didn't attend the exam.

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty

Course Coordinator

HOD Sign

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
WINTER 2022-2023

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr.I.SHEIK ARAFAT

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : E		Course Handling Faculty : Dr.I.SHEIK ARAFAT			
1.	VTU19156	REDROWTHU DURGA PRASAD	A	A	RA
2.	VTU19316	KOTHAPALLI CHANDRA NITHIN	1	2	RA
3.	VTU19435	DHENUVAKONDA MADHUGNA KOUSIK	A	A	NE
4.	VTU20658	ALA PRATHYU SAI	15	18	D
5.	VTU20678	GUBBALA V V DURGA RAGHAVA AKHIL	A	A	D
6.	VTU20733	VULUVALA PAVAN KUMAR REDDY	15	19	B
7.	VTU20740	ABHIRAJ KUMAR SINGH	15	24	D
8.	VTU20778	NAVEEN KUMAR	11	13	RA
9.	VTU20924	MULE MADHAVA REDDY	12	17	AB
10.	VTU24102	SHUBHAM GOLDER	03	07	RA

Action Taken:
Gave important questions through question bank
Conducted special class for important topics
Slip test conducted

Improvements Observed:

All students performance are improved.
Two students got above 60% Marks.

Faculty

Course Coordinator

HOD Sign

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : Wireless Communication
Course Handling Faculty: Dr.I.Sheik Arafat
Course Coordinator : Dr. T.Kavitha

Course Code:10211EC112
Academic Year: 2023-2024
Semester : Summer

Date	Time
20.09.2023	4.45 PM – 5.35 PM
21.09.2023	4.45 PM – 5.35 PM
25.09.2023	4.45 PM – 5.35 PM
04.10.2023	4.45 PM – 5.35 PM
19.10.2023	4.45 PM – 5.35 PM
23.10.2023	4.45 PM – 5.35 PM
24.10.2023	4.45 PM – 5.35 PM
26.10.2023	4.45 PM – 5.35 PM

Faculty

Course Coordinator

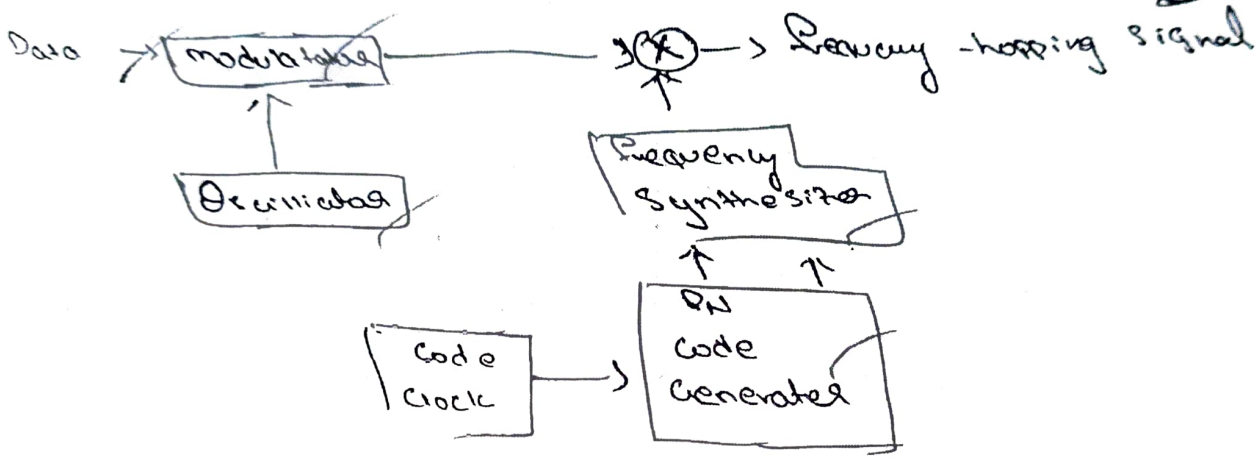
HOD ECE

CLASS: E SEM: V COURSE: Wireless Communication

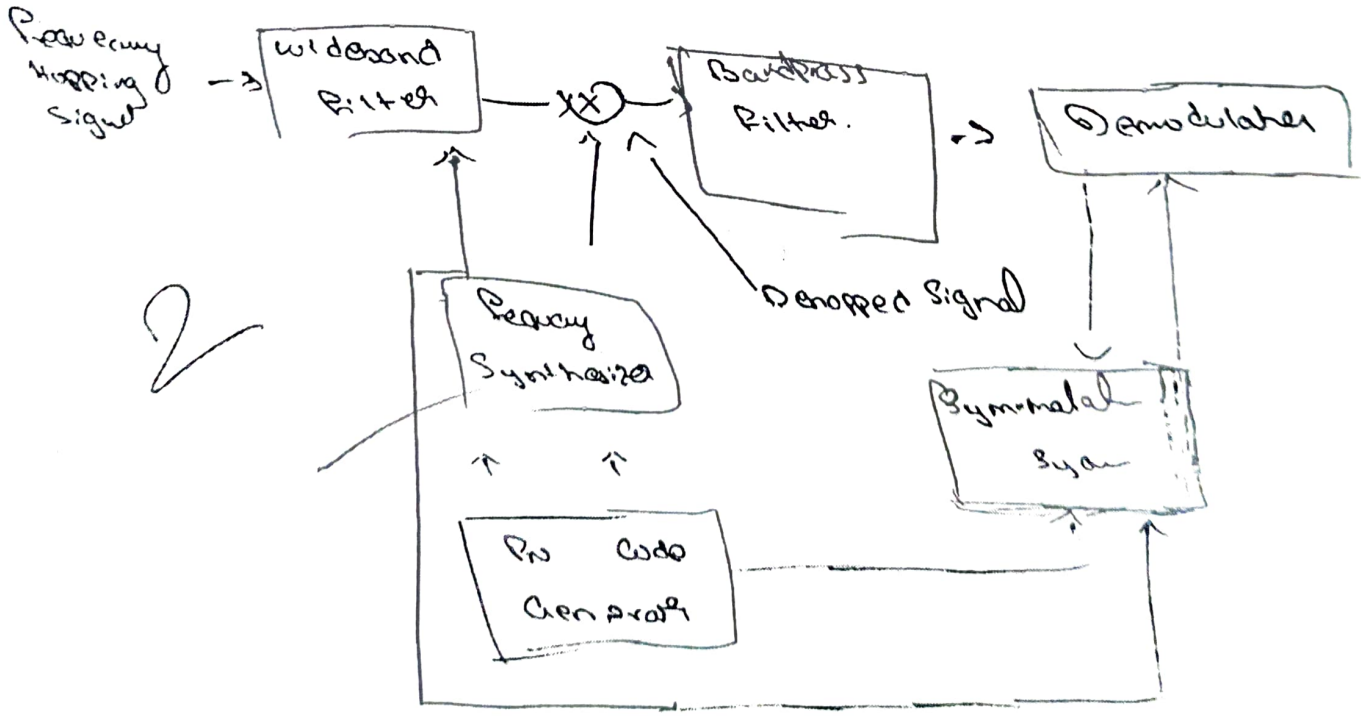
	Roll No	Name	Month	Sept			Oct				
			Date	20	21	25	04	19	23	24	26
			Hour	8	8	8	8	8	8	8	8
1	VTU19116	Rettamantha Durga Prasad		P	P	A	A	A	A	A	A
2	VTU19316	Kothapalli Chandra Mithin		P	P	A	P	P	A	P	P
3	VTU19757	D. Madhurya Kowshika		P	P	A	A	A	A	A	A
4	VTU20612	Ala Prathyu Sai		P	P	P	P	P	P	P	P
5	VTU20628	Durga Ragava Akhil		P	A	P	A	A	A	A	A
6	VTU20733	V Pavan kumar Reddy		P	P	P	P	P	P	P	P
7	VTU20740	Abhiraj kumar		P	P	P	OD	OD	OD	P	P
8	VTU20771	Naveen kumar		P	P	P	P	A	A	A	P
9	VTU20824	Mule Madhava Reddy		P	P	P	P	P	P	P	P
10	VTU21102	Subham Golder		P	P	P	P	P	P	P	P
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
	No. of Absentees			2	2	3	3	4	5	4	3
	Initials										

2/5

Modulator



Demodulator



1. Explain in detail about frequency hopping and spread spectrum.

[K. Chandra Sekhar Reddy, Lec 316, Sri Kavan]

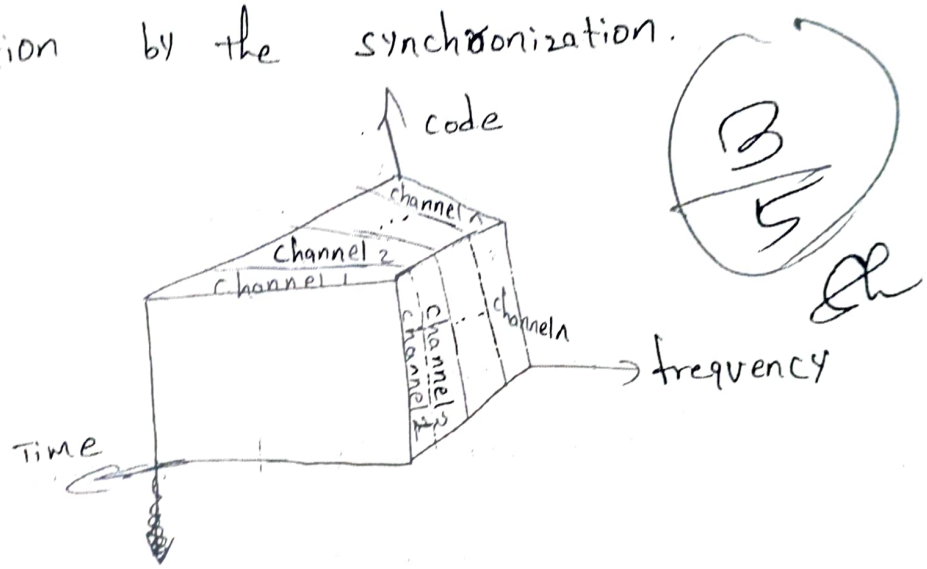
2. Explain hspk transmitter and receiver with signal spectrum diagram and give an expression for spectral efficiency.

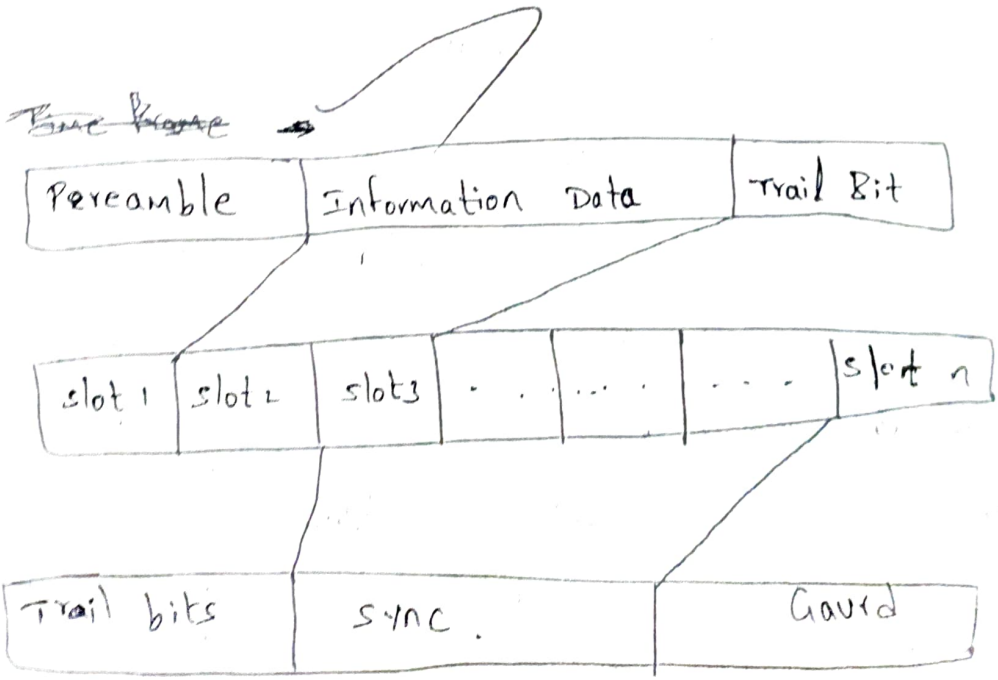
Frequency hopping involves a periodic change of transmission of the A frequency hopping signal may be regarded as a sequence of modulated data bursts with time varying pseudorandom carrier frequenecites. The set of possible the freqy of possbility frequency is called frequency hopping and spread. Hopping occurs over a

2

Pavan Kumar Reddy VTU20733

(TDMA) :- Time division multiple Access : to is used in mobile communication. It divides in to time frame. Each frame is to share the information which is aloted only in timeslot. the Data could be transmit only in time duration. It requires to transmits the information by the synchronization.





→ Working of TDMA

→ the Data transmitts only in the time slot.

→ the channel are divided in to time slot.

→ Each slot contains certain time to transmit data or information.

→ the users must get the information at ceratain time.

→ formula for the TDMA is

$$T_F = \left(1 - \frac{b_{OH}}{b_T}\right) \times 100\%$$

~~bOH → Number of~~

bOH is number of bits overhead of foame

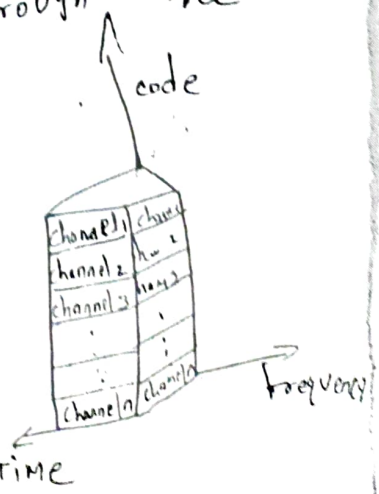
bT is number of Timeslots in frame

CDMA:- code division multiple access is used in mobile communication.

→ It is to transmit the data through the wireless communication

→ Near-far Problem needs to have the Power to verify the Problem.

→ the TDMA communicates the same information to the users. TDD (or) FDD



A. Prathyu Sai
VTU 20658

Hand off:

Hand off means when the mobile is on conversation and it moves to other channel from MBC to other channel. The change of one BS control to other BS control is called Hand off.

The Hand off consists of 4 stages in it. Those are

* Initiation.
* Reservation.
* Execution.
* Completion.

Slow Learner Attendance

CLASS: III Year SEM: V COURSE: Wireless Communication

Roll No	Name	Month	Aug			Sep			Oct	
		Date	16	17	28	5	7	11	3	4
		Hour	8	8	2	8	8	2	3	8
19107	KOUDI SRILKANTH REDDY		1	2	3	4	5	6	7	
19651	ADIKE VEERA HARSH KUMAR REDDY		1	2	3	4	5	6	7	

TOPICS Covered

16/8/23	Frequency Reuse
17/8/23	GPSK
28/8/23	Equalization
5/9/23	Diversity
7/9/23	FDMA
11/9/23	TDMA
3/10/23	MIMO
4/10/23	3G
5/10/23	4G
9/10/23	5G

No. of Absentees

Total

Seminar

5	9
8	8
9	8
2	9

Wireless Communication (WC) VTU19103
Kondi Srikanth Reddy

w the signals are affected by diffraction using knife-edge model.

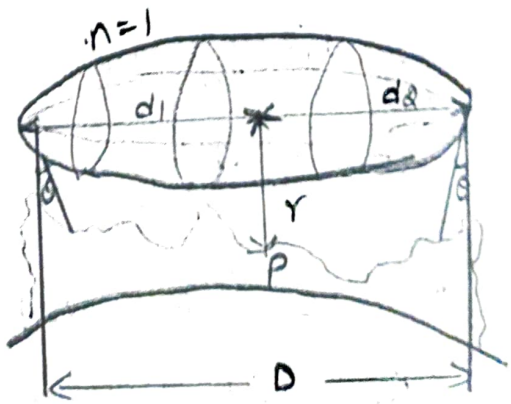
The phenomenon of diffraction can be explained by Huygen's principle, which states that all points on a wavefront can be considered as point sources for the production of secondary wavelets.

The concept of difraction loss as a function of path difference around an obstruction is explained by Fresnel zones.

Fresnel zones:- Transmitted electromagnetic waves can follow slightly different paths before reaching a receiver, especially if there are obstructions or reflecting objects between the two waves.

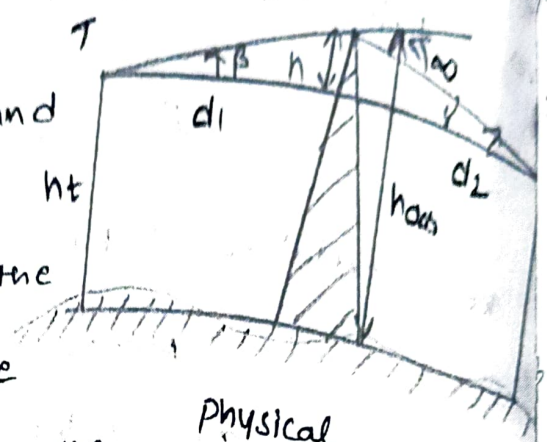
Radius of nth Fresenel zone can be calculated as,

$$r_n = \sqrt{\frac{n\lambda d_1 d_2}{d_1 + d_2}}$$



Fresnel zones.

Simply, the model can be explained as follows:



Assuming $h < d$ and $h >> d_1, d_2$, then the ht difference between the direct path and the diffracted path, called the excess path length Δ can be:

Physical mode for knife edge.

$$\Delta = (P_1 + P_2) - (d_1 + d_2)$$

$$P_1 = \sqrt{d_1^2 + h^2} \qquad P_2 = \sqrt{d_2^2 + h^2}$$

$$P_1 = (d_1^2 + h^2)^{1/2} \qquad P_1 = d_1\left[1 + \frac{h^2}{d_1^2}\right]^{1/2} = d_1 + \frac{h^2}{2d_1}$$

Similarly;

$$P_2 = d_2 + \frac{h^2}{2d_2}$$

$$\Delta = (P_1 + P_2) - (d_1 + d_2)$$

$$= d_1 + \frac{h^2}{2d_1} + d_2 + \frac{h^2}{2d_2} - d_1 - d_2$$

$$= \frac{h^2}{2d_1} + \frac{h^2}{2d_2}$$

$$\Delta = \frac{h^2}{2}\left(\frac{1}{d_1} + \frac{1}{d_2}\right)$$

$$\theta_\Delta = \frac{2\pi\Delta}{\lambda}$$

$$\theta_\Delta = \frac{\pi h^2}{\lambda}\left(\frac{d_1 + d_2}{d_1 d_2}\right)$$

find diffraction angle α:

$\alpha = \beta + \gamma$

$= \tan^{-1}\left(\frac{h}{d_1}\right) \qquad \gamma = \tan^{-1}\left(\frac{h}{d_2}\right)$

$\alpha = \tan^{-1}\left(\frac{h}{d_1}\right) + \tan^{-1}\left(\frac{h}{d_2}\right)$

and γ are very small,

$$\alpha = \frac{h}{d_1} + \frac{h}{d_2} = h\left(\frac{d_1 + d_2}{d_1 d_2}\right)$$

Fresnel - Kirchoff parameter,

$$\frac{E_d}{E_0} = F(v) = \frac{(1+j)}{2} \int_v^\infty \exp\left((-j\pi t^2)/2\right) dt$$

The Fresnel integral $F(v)$ is a function of the Fresnel - kirchoff diffraction parameter v defined as,

$$v = h\sqrt{\frac{2(d_1+d_2)}{\lambda d_1 d_2}} = \alpha\sqrt{\frac{2d_1d_2}{\lambda(d_1+d_2)}}.$$ //

Vel Tech
Rangarajan Dr. Sagunthala

List of Slow Learners – Action Planned Report

Course Title : Wirless Communcation
Course Code : 10211EC112
Semester. : Summer
Course Coordinator: Dr.T.Kavitha

Date after UT-I:09.08.23
Academic Year :2023-2024
Sec:F

S.No	VTU No.	Name of the Student	Category	Performance in T- 1 CIA
		Sec:F Course Handling Faculty :Dr.S.Thenappan		
1	VTU19103	KOUDI SRIKANTH REDDY	C	2
2	VTU19651	ADIKE VEERA HITESH KUMAR REDDY	C	0

Category 'C' and failures in UT-1 (Consider AB as 0 Mark).

Reason for Low Performance:

Students were not attending the classes regularly. Informed their Mentors regarding the attendance percentage.

Action Planned:

Question Bank was prepared with 1 mark,4marks and 6 marks with answers. Students will be informed to maintain separate notebook to study and write big questions. Planned to conduct special classes.

Faculty

Course Coordinator

HOD Sign

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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			T2	T3	End Semester Result
Section : F		Course Handling Faculty : Dr.S.Thenappan			
1.	VTU19103	KOUDI SRIKANTH REDDY	14	13.5	C
2.	VTU19651	ADIKE VEERA HITESH KUMAR REDDY	14	2	D

Action Taken:
Conducted the slip test and special class for slow learners.

Improvements Observed:

It is observed the slow learners improved mark in the T2 and T3

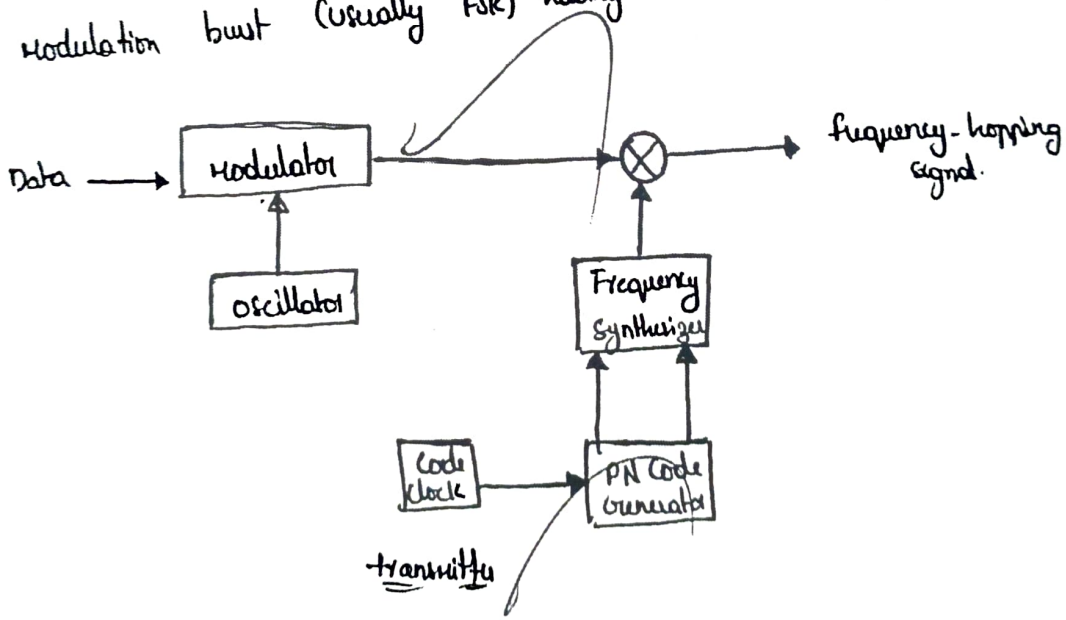
Faculty

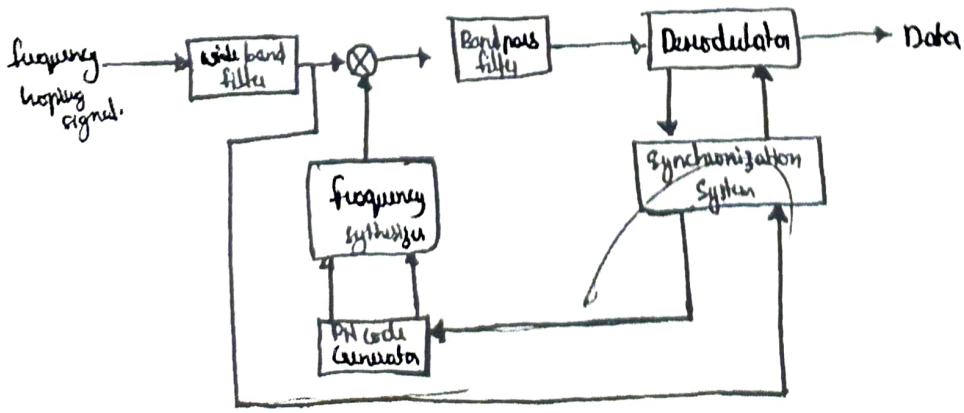
Course Coordinator

HOD Sign

Frequency hoping involves a periodic change of transmission frequency. A frequency hopping signal may be regarded a sequence of modulated data bursts with time-varying, pseudorandom carrier frequencies. The set of possible carrier frequencies is called the hopset.

Hopping occurs over a frequency band that includes no of channels. Each channel is defined as a spectral region with a central frequency in the hopset and a bandwidth large enough to include most of the power in a narrowband modulation burst (usually FSK) having the corresponding carrier frequency.



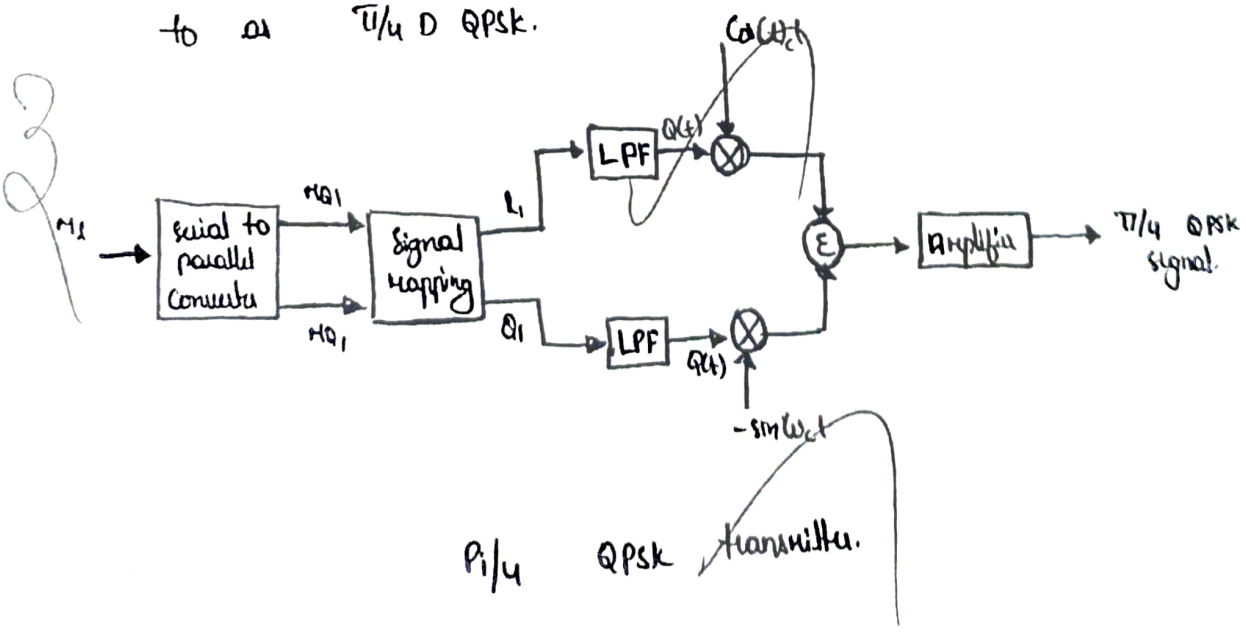


Receiver

π/4 QPSK :

- In π/4 QPSK the maximum phase change is limited to ± 135°
- So it has less amplitude fluctuations than QPSK.
- It can be detected non-coherently.
- The phase shift between successive symbols is an integer multiple of π/4 radians.
- There exists two sets of signal constellations (0, 90, 180, 270) & (45, 135, 225, 135).

In wireless channels in the presence of multipath spread and fading, π/4 QPSK perform better than OQPSK. when π/4 QPSK signals are differentially encoded, the scheme is referred to as π/4 D QPSK.



π/4 QPSK transmitter.

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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : G		**Course Handling Faculty :** Dr. Sahaya Sheela M		
1.	VTU19846	Chinthalapudi Naga Karthik Babu	C	AB
2.	VTU20647	Vennapusa Siva Reddy	C	10
3.	VTU20654	Bezawada Urdhva Raghav	C	6
4.	VTU20770	Ummineni Thirupathi Naidu	C	10
5.	VTU21073	Pujari Hebbatam Vinod Kumar	C	AB
6.	VTU21118	Bhoomireddy Vishnu Teja Reddy	C	AB
7.	VTU21236	Pamujula Jaswanth	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- Poor Attendance.
- They get confused to draw the diagrams and Formula.
- Lagging of solving the problems.
- The students were not writing the derivations properly.

Action Planned:

- Inform the students to write formula, diagram and key points in QB.
- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test and special class for slow learners.

Faculty

Course Coordinator

HOD/ECE

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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : G		**Course Handling Faculty :** Dr. Sahaya Sheela M			
1.	VTU19846	Chinthalapudi Naga Karthik Babu	AB	15	RA
2.	VTU20647	Vennapusa Siva Reddy	AB	AB	D
3.	VTU20654	Bezawada Urdhva Raghav	6.5	22.5	B
4.	VTU20770	Ummineni Thirupathi Naidu	7	15	D
5.	VTU21073	Pujari Hebbatam Vinod Kumar	15	5.5	C
6.	VTU21118	Bhoomireddy Vishnu Teja Reddy	AB	AB	NE
7.	VTU21236	Pamujula Jaswanth	AB	15	RA

Action Taken:

- Slip test was conducted.
- Extra coaching classes were conducted.
- Revision and Practice for tutorials.
- Instructed the students to present the answers in a legible way.

Improvements Observed:

- Out of seven slow learners one student passed in Test-2 after repetitive coaching.
- Out of seven slow learners Four students passed in Test-3 after repetitive coaching.

Faculty **Course Coordinator** **HOD/ECE**

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table (17.08.2023-12.10.2023)

Course Code and Title : 10211EC112 / Wireless Communication

Section : G

Course Coordinator : Dr. Kavitha T

S. No	Date	Timing
1	17.08.2023	4.45 pm – 5.35 pm
2	22.08.2023	4.45 pm – 5.35 pm
3	24.08.2023	4.45 pm – 5.35 pm
4	30.08.2023	4.45 pm – 5.35 pm
5	04.09.2023	4.45 pm – 5.35 pm
6	07.09.2023	4.45 pm – 5.35 pm
7	13.09.2023	4.45 pm – 5.35 pm
8	19.09.2023	4.45 pm – 5.35 pm
9	27.09.2023	4.45 pm – 5.35 pm
10	05.10.2023	4.45 pm – 5.35 pm
11	09.10.2023	4.45 pm – 5.35 pm
12	12.10.2023	4.45 pm – 5.35 pm

Course Coordinator

Slow learners list

CLASS: III ECE SEM.: V Sem COURSE: 10211EC112 - Wireless Communication

Roll No	Name	Month							
		Date	17/8	22/8	24/8	30/8	4/9	7/9	13/9	14/9
		Hour	8	8	8	8	8	8	8	8
19846	Chinthalapudi Naga Karthick Babu		1	2	A	3	4	5	6	7
20647	Vemmapuga Siva Reddy		1	2	3	4	A	5	6	7
20654	Bezawada Uthhav Raghav		1	2	3	4	5	6	7	8
20770	Ummineni Thirupathi Naidu		1	2	3	4	5	A	6	7
21073	Pujari Hebbatam Vinod Kumar		1	2	3	4	5	6	7	8
21118	Bhamireddy Vishnu Teja Reddy		A	1	2	3	4	5	6	7
21236	Pemmjula Jaswanth		1	2	3	4	5	6	7	A

CLASS ACTIVITIES

17.08.23	Test 1 QP discussion
22.08.23	Unit-2 problem solving session
24.08.23	Slip Test-3
30.08.23	offset QPSK, GMSK
04.09.23	DSSS, FHSS
07.09.23	Fading
13.09.23	Slip Test 2
19.09.23	Unit 3 Revision for Test
27.09.23	Test 2 QP discussion
05.10.23	Equalization Techniques
09.10.23	diversity Techniques
12.10.23	Unit-4 problem discussion

No. of Absentees	1	–	1	–	1	1	–	1
Initials								

Seminar

8	8	8	8
8	A	9	10
8	9	10	11
A	9	10	11
8	9	10	A
9	A	10	11
8	9	10	A
8	9	A	10

1 2 1 2

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Vennapusa Siva Reddy
VTU 20647

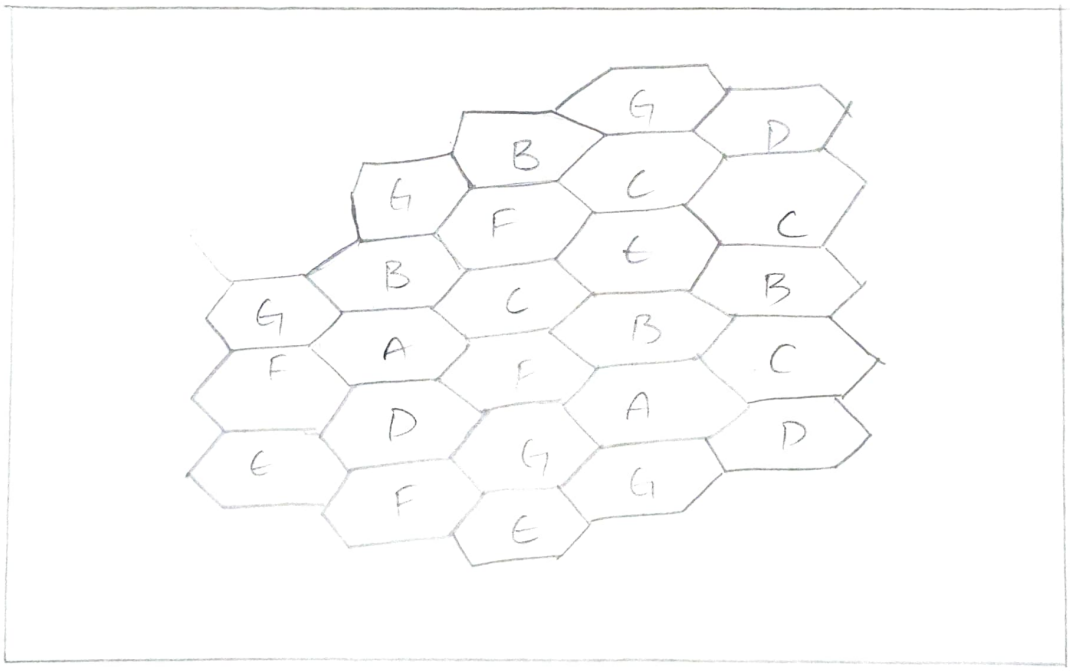
Slip Test - 1

PART-B

9/10

Frequency reuse :-

The ability to use the same frequencies repeatedly across a cellular system. As each cell uses radio frequencies only within its boundaries, the same frequencies can be reused in other cells far away with a limited possibility of interference



- Frequency reuse - there are several cells that use the same set of frequency.
  - co-channel cells
  - co-channel Interference
- To reduce co-channel interference cell must be spparated by a minimum distance.

- when the size of the cell is approximately the same.
- co-channel interference is independent of the transmitted power.
- co-channel interference is a function of

  R - Radius of the cell

  D - Distance

  $Q = D/R$

  Q is called co-channel reuse ratio
- A small value of Q provides large capacity
- A large value of Q improves the transmission quality smaller level of co-channel interference.

$$Q = \frac{D}{R} = \sqrt{3N}$$

7A) Free space propagation path loss model :-

$$P_r(d) = \frac{P_t G_t G_r \lambda^2}{(4\pi)^2 d^2 L} \quad -(1)$$

where,

P_t - Transmitted power

$P_r(d)$ - Received power which is the function if the T-R separation

G_t - Transmitted antenna gain

G_r - Receiver antenna gain

d - T-R separation distance

L - system loss

λ - wavelength

P_t and P_r – same units

G_t and G_r – Dimensionless quantities

If $L=1$, no loss

$L \geq 1$, System loss not related to propagation model

$L \leq 1$, miscellaneous loss occur due to Transmission line attenuation, filter losses and antenna losses.

Path loss in free model is given by,

$$PL(dB) = 10\log \frac{P_t}{P_r}$$

from eq (1)

$$PL(dB) = 10\log \frac{P_t}{P_r} = -10\log \left[\frac{G_t G_r \lambda^2}{(4\pi)^2 d^2}\right]$$

Assume antenna gains are unity

$$PL(dB) = 10\log \frac{P_t}{P_r} = -10\log \left[\frac{\lambda^2}{(4\pi)^2 d^2}\right]$$

Given,

a) 4-cell reuse

cluster size (N) = 4

Total BW = 33MHz

Channel BW = 25KHz x 2 simplex channel

Total available channels $= (33000 \times 10^3) / 50 \times 10^3$

660 channels

Total no. of available channel per cell $= \frac{\text{Total available channel}}{N}$

$= \frac{660}{4} = 165$ channels

b) For $N = 7$, $\frac{660}{7} = 95$ channels

c) $N = 12$, $\frac{660}{12} = 55$ channels

) Given,

$v = 6$ miles/hr

$f = 1850$ MHz

1 mile $= 1609.344$ m

60 mile $= 96560.64$ m/hr $= 26.8224$ m/sec

$f = \frac{2\pi}{\lambda} \Rightarrow \lambda = \frac{2\pi}{f} = \frac{2\pi}{1850 \times 10^6} = 0.1621$ m

Doppler shift $f_d = \frac{v \cos\theta}{\lambda}$ --- $\theta = 0^\circ$

$f_1 = f + f_d = 1850$ MHz $+ 165.4$ Hz

$= 1850.000165$ MHz

$f_2 = f - f_d = 1850$ MHz $- 165.4$ Hz

$= 1849.999835$ MHz

$\theta = 90^\circ$, $\cos\theta = \cos 90 = 0$

$$\therefore f_d = \frac{26.8224 \times \cos 90}{0.1621}$$

$$= 26.8224 \times 0.001621 = 0$$

$$f_3 = f + f_d = 1850\text{MHz} + 0$$

$$= 1850\text{MHz}$$

PART-A

Types of hand off :-

Hard hand off

Soft hand off

Hard hand off - mobile monitors BS and new cell is allocated to a call with strong signal

Soft hand off - MS with 2 or more calls at the same time

dwell time :-

The time over which the call may be maintained within a cell without handoff is called dwell time.

footprint :-

Actual radio coverage of cell is called a foot print. It is determined from the field measurement

3A) Brewster angle = $\sin\theta_B$

$$= \sqrt{\frac{\varepsilon_r - 1}{\varepsilon_r^2 + 1}}$$

$$= \sqrt{\frac{3.9 - 1}{(3.9)^2 + 1}}$$

$$= \sqrt{\frac{29}{15.21 + 1}} = \sqrt{0.204}$$

4A) **Doppler shift** :-

If the receiver is moving towards the source, then the zero crossings of the signal appear faster and the reveived frequency in higher. The opposite effect occurs if the receiver is moving away from the source

5A) **Time selective** :-

The gain and the signal stregth of the received signal are time varying means then the channel is described as time selective channel.

Frequency selective

The channel is time invairent but the impulse response of the channel show a frequency dependent response so called frequecy selective channel.

Slip Test - 1

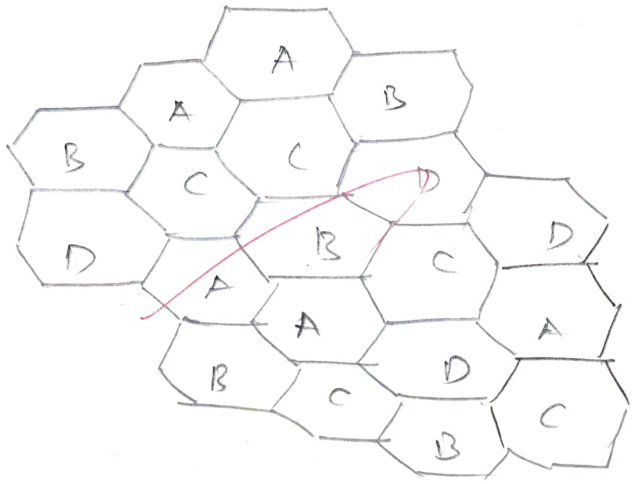
H. Vinod Kumar
21073

Frequency reuse:

Definition:

$d \gg \sqrt{h_t h_r}$

The ability to use the same frequencies repeatedly across a cellular system. As each cell uses radio frequencies only within its boundaries, the same frequencies can be reused in other cells far away with a limited possibility of interference.



- Frequency reuse - there are several cells that use the same set of frequencies.
  - co channel cells
  - co channel interference.
- To reduce co-channel interference, co channel cell must be separated by a minimum distance.
- when the size of the cells is approximately the same - co channel interference is independent of the transmitted power.

- co channel interface is a function of

R - Radius of the cell

D - Distance of the center of the nearest co-ch cell

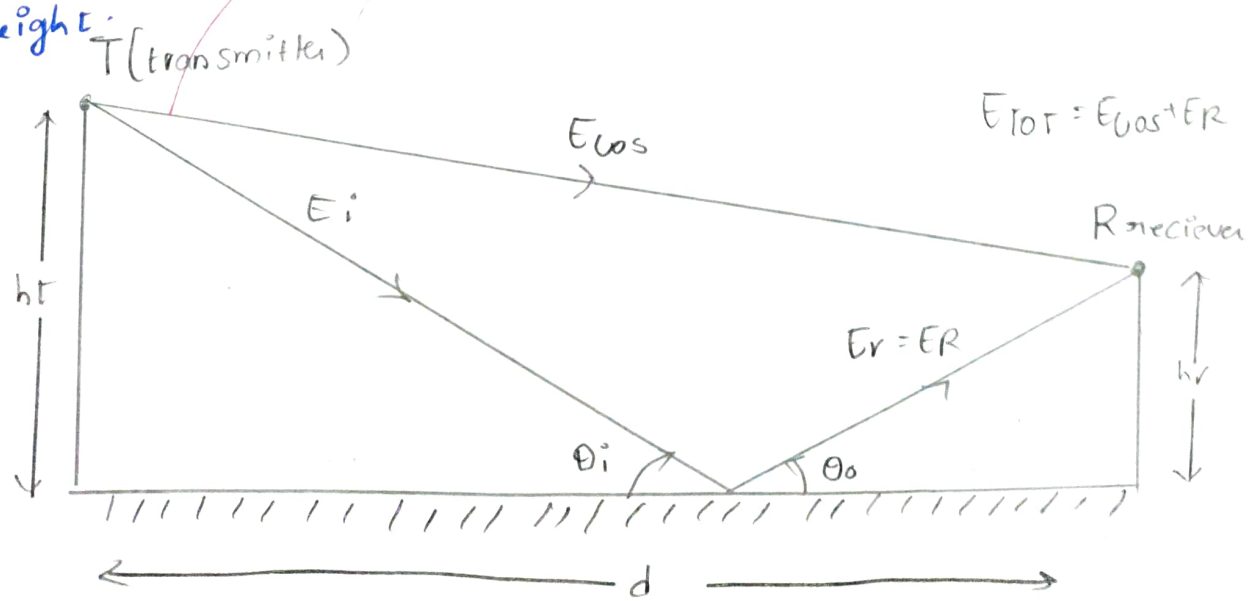
$Q = D/R$.

- Q is called the co-channel reuse ratio.
- A small value of Q provides large capacity - larger value of co channel interference.
- A large value of Q improves the transmission quality - smaller level of co-channel interference

$$Q = \frac{D}{R} = \sqrt{3N}$$

2. Two ray Ground Reflection model.

The two rays ground - reflection model is a multipath radio propogation model which predicts the path losses blw a transmitting antenna and a receiving antenna when they are in the line of sight (LOS. Generally, the two antenna each have different height.



Two ray ground reflection model.

two ray model, which consists of two overlapping waves at the receiver, on direct path and one reflected wave from the ground

- Total electric field is the sum of electric field of direct line of sight component and the electric fields of ground reflected component

$$E_{TOT} = E_{LOS} + E_g$$

where,

h_t is height of the transmitter

h_r is height of the reciever.

E_0 is free space electric field (v/m)

d_0 is reference distance.

Free space propogation of E field is given by $(d > d_0)$

$$E(d,t) = \frac{E_0 d_0}{d} \cos\left(\omega_c \left(t - \frac{d}{c}\right)\right) \quad (d > d_0)$$

$$E_{LOS}(d,t) = \frac{E_0 d_0}{d} \cos\left(\omega_c (t - d/c)\right)$$

$$E_{LOS}(d,t) = \frac{E_0 d_0}{d} \cos\left(\omega_c \left(t - \frac{d}{c}\right)\right)$$

- Assume perfect horizontal E-field polarization and ground reflection

$$r = -1$$

from equ 28

$$E_{TOT}(d,t) = \frac{E_0 d_0}{d} \cos\left(\omega_c \left(t - \frac{d}{c}\right)\right) + (-1)\frac{E_0 d_0}{d} \cos\left(\omega_c \left(t - \frac{d}{c}\right)\right)$$

$$E_r = \Gamma E_i$$

$$E_t = (1 + \Gamma) E_i$$

MIMO Systems. Test - 2

Vidhar Raghav
VTU 20654

multiple - input multiple - Output (MIMO) is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time.

8/10

2) How does the capacity be increased CDMA?

Sectorization increases the capacity of CDMA systems.

3) In the US, each cellular carrier is allocated to N channels, and total bandwidth $B_t = 12.5\,MHz$, guard bandwidth $B_g = 10\,KHz$, channel bandwidth $B_C = 30\,KHz$, in Find the number of channels supported?

Number of channels

$$N = \frac{B_t - 2B_{guard}}{B_C}$$

$$= \frac{12.5\times10^{-6} - 2\times10\times10^{3}}{30\times10^{3}}$$

N = A16 channels.

4) what are the challenges in deploying 5G networks on a global scale?

* Spectrum Allocation.
* High Frequency Bands
* Infrastructure investment
* Regularitory and policy challenges
* Networks security concerns
* Energy efficiency.

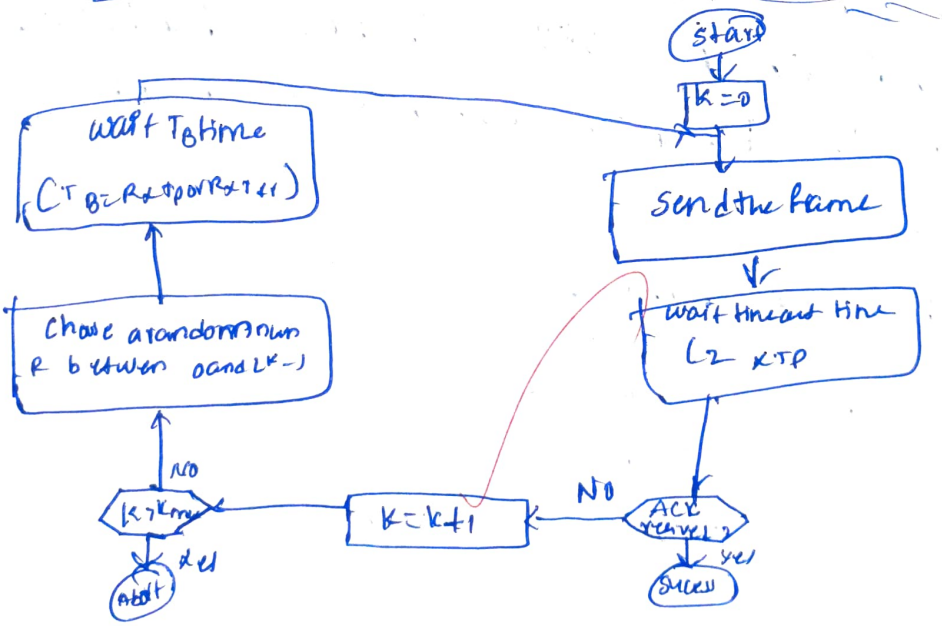
(5) How does WCDMA ...

(or) it is differ from other technologies related to com... higher data rates, greater capacity, improved voice ... global standard, broadband data and d evolvability. it's important to note that while WCDMA was a major step forward in 3G mobile technology.

Part-B

(6) Discuss the throughput performance of ALOHA and Slotted Aloha.

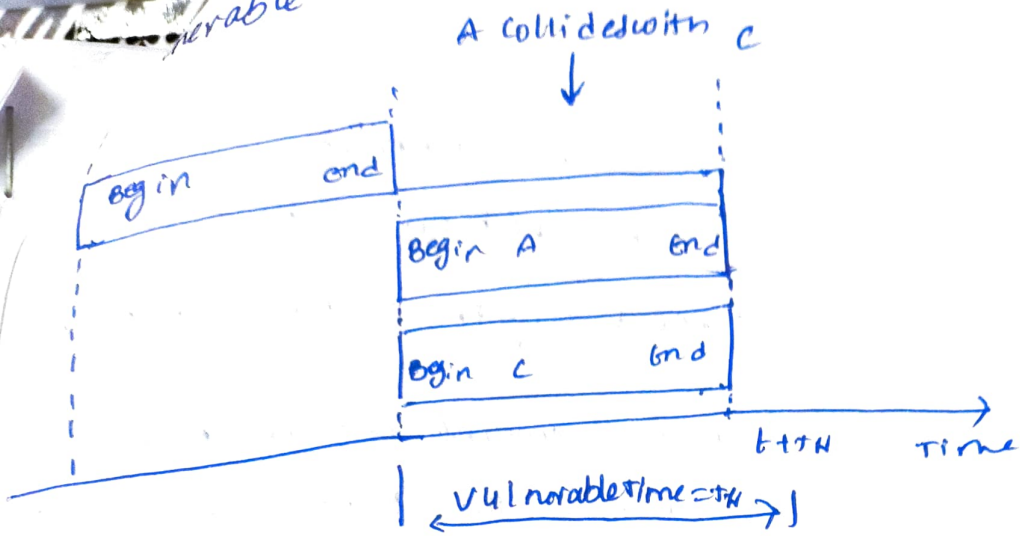
Procedure for pure ALOHA protocol



Slotted Aloha

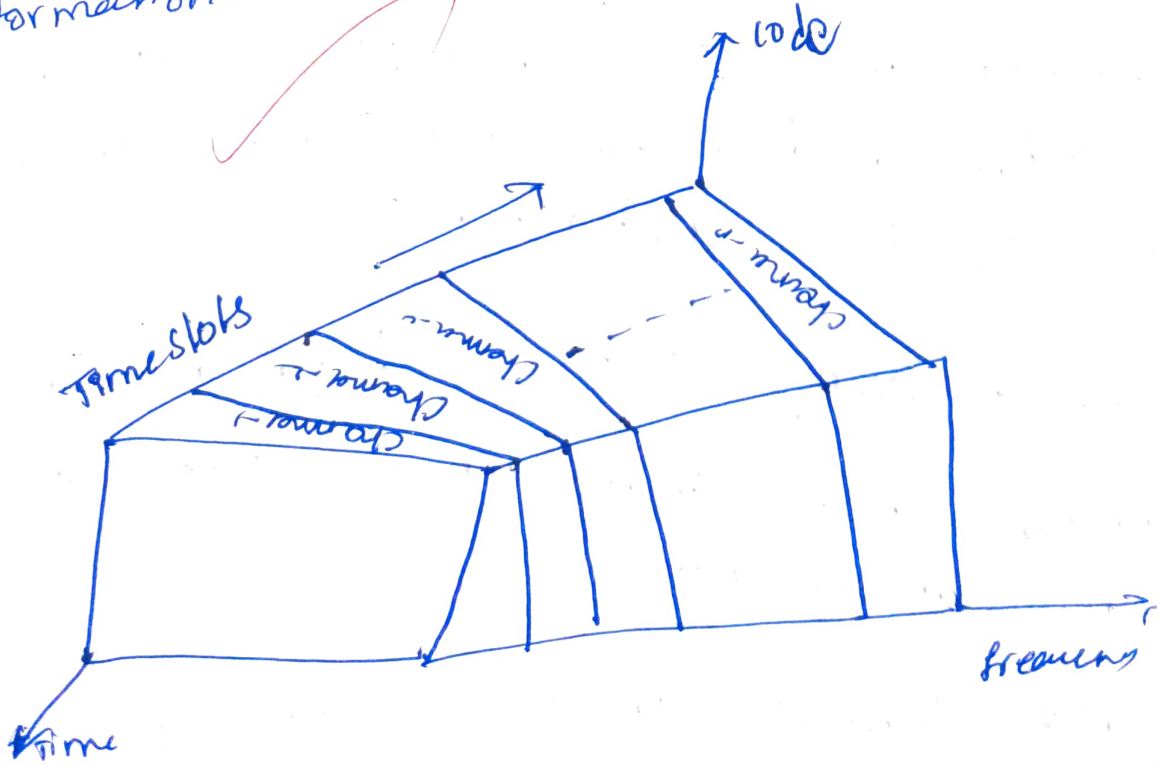
* Slotted Aloha was invented to improve the efficiency of pure Aloha as chances of collision in pure Aloha are very high.
* In slotted ALOHA there is still a possibility of collision if two stations try to send at the beginning of the same time slot.
* Slotted Aloha still has an edge over pure Aloha as chances of collision are reduced to one-half

Time for slotted ALOHA protocol



Explain the principle, frame structure and working of TDMA system

TDMA is a multiple access technique used in mobile communication systems. In TDMA, the channel is divided into time slots, and each station is given a timeslot to transmit data during that timeslot only. The frame so-defined is divided into time slots. and each user is assigned a Time slot in which to transmit its ~~int~~ information.



Here is a table that summarizes the frame structure TOMA.

Frame structure	Description
Frame	A collection of time slots
Time slot	A fixed length of time data transmitted
Guard Time	A small amount of time b/w each time slot. to prevent b/w slot.

(8) ~~Illustrate the multiuser MIMO system model with example.~~

(9) Summarize the features and advantages of LTE Technology.

- ~~LTE has LP~~ LTE is a 4G cellar technology that has been the primary communications network for moblie phones since 2009. It's used for mobile, fixed, and portable broadband access.

Features of LTE Inside

Faster speeds: LTE has PEEK data rate of 100 mbps for down link and 50 mbps for uplink it's 5-10 times faster than 3G.

Reduced latency: LTE is designed for lower latency, which is the time it takes for data to travel in the network

Scalable bandwidth Capacity: LTE has scalable bandwith capacity.

ward integration. LTE has backward integration of hsm and umts technologies.

support multiple services.

Advantages:

Faster web browsing

High-quality video and livestreaming

Longer battery life

Decreased network loads.

20) Describe the fundamental architecture of a 5G wireless system.

The architecture of 5G wireless system is based on three main components:

User Equipment : The device that connects to the 5G network.

Radio Access Network

core Network

The 5G core architecture includes:

User plane Function

Data network

Core Access and mobility management Function

Authentication server Function

Session management Function

Network slice selection Function.

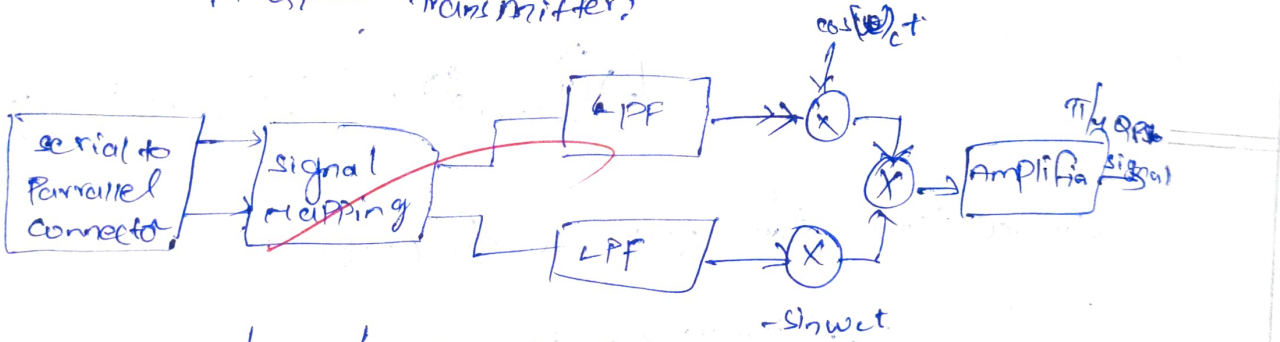
Jaswanth
VTU 21236

QPSK:

In π/4QPSK the maximum phase change is limited to ±135°.

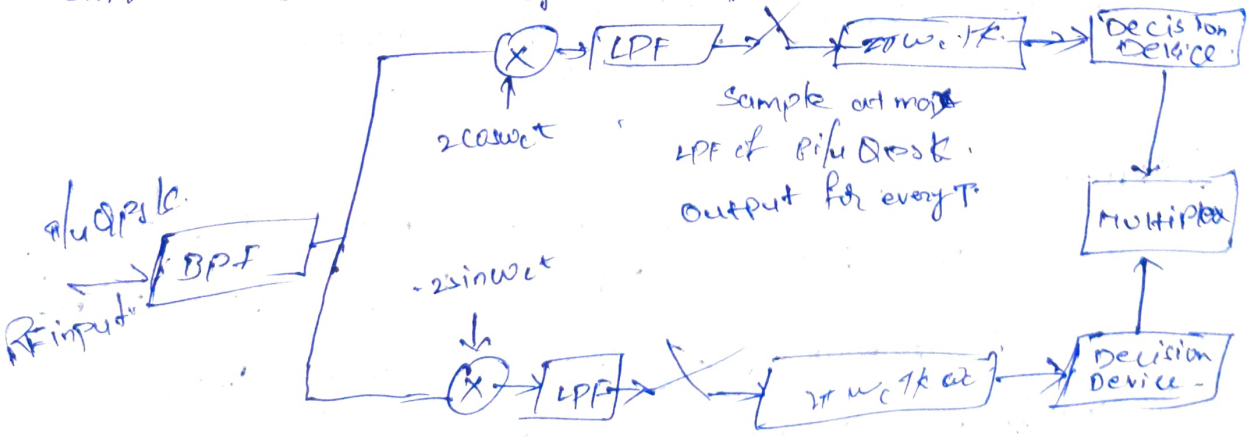
* So it has less amplitude fluctations than QPSK.
* It can be detected non-coherently.
* The phase shift between successive symbols is an integer multiple of π/4 radius
* There exists two sets of signal constellations (0, 90, 180, 270) & (45, 135, 225, 315)
* In wireless channels in presence of multipath, spread and feding π/4 QPSK performs better than QPSK signals are differently encoded, ther scheme is referred to as π/4D QPSK

π/4 QPSK transmitter:



Generate π/4 QPSK transmitter.

differential detection of π/4 QPSK.



Block diagram of a baseband differential detector

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC112/ Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : H		**Course Handling Faculty :Dr. I. Nandhini**		**TTS No:3737**
1.	VTU19650	NALAGARLA DILEEP	C	08
2.	VTU19769	JAGARLAMUDI MANINDRA	C	12
3.	VTU19866	KATKOJU AJAY KUMAR	C	08
4.	VTU20772	BATHALA GANESH	C	10
5.	VTU20801	SHAIK AYAZ	C	04
6.	VTU20884	PILLI PAVAN SRINIVAS	C	08
7.	VTU21095	NAKKA VENKATA SAI KRISHNA	C	AB
8.	VTU21102	VANGA ADI VISHNU MANIKANTA	C	08
9.	VTU21191	PASUPULETI SAI RAM	C	8.5
10.	VTU21286	KONCHA BHARADWAJ SWAMY	C	9.5
11.	VTU23941	RAJESH S	C	9.5
12.	VTU24017	SUGUMAR T	C	5.5
13.	VTU24077	KARREDDULA SUDHARSHAN REDDY	C	05

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and most of them are late registration students.

The students are not writing the derivations properly.

Action Planned:

Give practice to solve more numerical problems.

Planned to conduct more slip test and special class for slow learners

Faculty **Course Coordinator** **HOD Sign**

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE 2021 B.TECH-ECE

SUMMER 2023-24

SLOW LEARNERS TIMETABLE

Course Handling Faculty: Dr.I.Nandhini

TTS No: 3737

Course Code &Title: 10211EC112/Wireless Communication

Section: H

Course Category: Programming Core

Date	Activity
25.10.2023	UNIT: 1 Problem Solving
26.10.2023	Slip Test in Unit 1
30.10.2023	Test 1: Group Discussion
31.10.2023	Unit 2: Problem Solving
01.11.2023	Slip Test in Unit 2
02.11.2023	Unit 3 : Problem Solving

Faculty

Course Coordinator

HOD

Balhab Ganesh
VTU 20772

Design of Rake receiver using MATLAB

Ans:)



```
Matlab
% Rake Receiver Simulation
% parameters
num_paths = 3;
% Number of multipath
Component's
SNR_dB = 20;
% Signal-to-Noise Ratio in dB
modulator_order = 4; %.
opsk modulation
% Generate random opsk
Symbols
num_Symbols = 1000;
tx_Symbols = randi([0,
modulation_order-1],
1, num_Symbols);
```

```
% Modulate the Symbol's
tx_Signal =
PSK mod (tx_Symbols,
modulation_order);
% Create multipath channel
channel_delays = [0, 1, 2];
% Delays for the multi-path
components
channel_gains = [1, 0.8, 0.5] %
Gains for the multi-path
components
chan = rayleighchan (1/100e3,
channel = delays;
channel_gains);
% Apply channel to the
transmitted signal
rx_signal = filter
(chan, tx_Signal);
% plot Constellation diagram Scatterplot
(rx_Symbols_table)
;
title ('Received
Constellation Diagram');
```

Discuss the Standalone and Non-Standalone considerations in 5G deployment options.

In 5G deployment, there are two primary deployment options:
Standalone (SA) and non-Standalone (NSA).
There options differ in terms of the architecture and the evolution of the 5G network.
Let's discuss the key considerations for each;

1) Independence from 4G:- In a Standalone 5G deployment, the 5G network operates independently of the existing 4G (LTE) network. it doesn't rely on the 4G infrastructure for control (or) signaling.

2) *New core Network (5GC): *SA 5G requires the implementation of a new core (5GC). This core network is built from the ground up to support 5G services and functionalities.

Near-far interference results into adjacent channel interference in a multiuser system.

The statement "Near-far interference results into adjacent channel interference in a multiuser system" is a common observation in systems.

it pertains to the interference that occurs when a strong signal from one user (the "near" user") in a multiuser system interfere with the communication of another user channel.

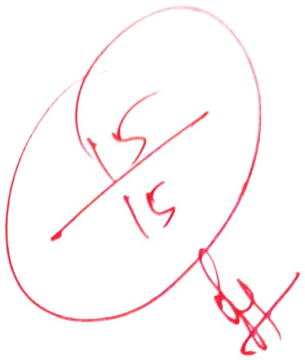
Let me provided an example to illustrate this concept.

Near user (user A): * user A is located close to a cell tower (or) base station. As a result, the signal strength between user A and the base station is very strong.

user A can easily establish a reliable connection and has excellent signal quality.

Pasulpuleti Sai Ram
VTU 21191

Simulate the BER of QPSK for two branch diversity receiver under independent Rayleigh fading Apply:
i) Equal gain Combining ii) Selection Combining
iii) Maximal ratio combining; Provide the MATLAB code.



```
% Define Parameters
SNR_dB = -10:2:20;
SNR = 10.^(SNR_dB/10);
num_symbol = 1e5;
Nt = 2;
% Generate QPSK symbol
tx_symbol = randi([0 3], 1, num_symbols);

% Modulate symbols
tx_symbols = qammod (tx_symbols, 4);

% Initialize BER vectors for diff combining techniques
BER_egc = zeros (size (SNR_dB));
BER_sc = zeros (size (SNR_dB));
BER_mrc = zeros (size (SNR_dB));

% Simulation loop
for i = 1:length (SNR)

    h=(randn (Nt, num_symbols) + 1i * randn (Nt, num_symbols))

% Receive Signals
    rx_egc =sum (h.* repmat (tx_symbols, Nt, 1), 1);
    rx_sc = max (abs (h) .* repmat (tx_symbols, Nt, 1), [], 1);
    rx_mrc = sum (conj(h) *repmat (tx_symbols, Nt, 1), 1);
```

```
% Add noise
noise = sqrt(1/(2*SNR(i)))
rx_egc = rx_egc + noise;
rx_sc = rx_sc + noise;
rx_mrc = rx_mrc + noise;

% Demodulate received symbols
rx_symbols_egc = qamdemod(rx_egc, 4);
rx_symbols_sc = qamdemod(rx_sc, 4);
rx_symbols_mrc = qamdemod(rx_mrc, 4);

% Calculate bit errors
BER_egc(i) = sum(rx_symbols_egc ~= tx_symbols)
BER_sc(i) = sum(rx_symbols_sc ~= tx_symbols)
BER_mrc(i) = sum(rx_symbols_mrc ~= tx_symbols)
end

semilogy(SNR_dB, BER_egc, 'b-', 'LineWidth', 1.5);
hold on;
semilogy(SNR_dB, BER_sc, 'r--', 'LineWidth', 1.5);
semilogy(SNR_dB, BER_mrc, 'g-.', 'LineWidth', 1.5);
legend('Equal Gain Combining', 'Selection Combining',
       'Maximal Ratio Combining');
xlable('SNR (dB)');
ylable('Bit Error Rate (BER)');
title('BER of QPSK with two-Branch Diversity Receiver');
grid on;
```

(2) Spreading of narrow bandwidth of baseband signal is accomplished through the use of a spreading code, called PN code. State the two most important properties and three criteria which can be used to validating that a sequence of numbers is practically random.

⇒ The two most important properties of a PN {Pseudorandom Noise} code are:-

1:- Pseudorandomness:- A PN code should exhibit a pattern that appears random, even though it is deterministically generated.

2:- Orthogonality:- In a multi-user communication system, the autocorrelation of the PN code should be low, meaning that the codes should be nearly orthogonal to each other. This allows for multiple users to share the same bandwidth without significant interference.

⇒ Three criteria to validate that a sequence of numbers is practically random are:

1:- Statistical Uniformity:- A random sequence should have an approximately equal distribution of values, meaning each value occurs with roughly the same probability.

2:- Lack of Predictability:- It should be difficult to predict the next element in the sequence based on knowledge of previous elements.

3. Absence of Correlation:- There should be no discernible patterns or relationships between successive numbers in the sequence.

Improving 4G/5G air interface security: A Survey of existing attacks on different LTE layers. Discuss

Improving the air interface security of 4G and 5G networks is crucial for safeguarding communications and preventing unauthorized access. Here's brief survey of existing attacks on different LTE layers:

1: Physical Layer Attacks:

* Jamming Attacks:- Involves flooding the wireless channel with interference to disrupt legitimate transmissions.

* Eavesdropping:- Unauthorized parties may intercept wireless signals to gain access to sensitive information.

2: MAC Layer Attacks:

* Denial of Service (DOS):- Attackers flood the Medium Access Control (MAC) layer with excessive signaling or data traffic, rendering the network.

3. Absence of Correlation:- There should be no discernible patterns or relationships between successive numbers in the sequence.

Improving 4G/5G air interface security: A Survey of existing attacks on different LTE layers. Discuss

Improving the air interface security of 4G and 5G networks is crucial for safeguarding communications and preventing unauthorized access. Here's brief survey of existing attacks on different LTE layers:

1: Physical Layer Attacks:

* Jamming Attacks:- Involves flooding the wireless channel with interference to disrupt legitimate transmissions.

* Eavesdropping:- Unauthorized parties may intercept wireless signals to gain access to sensitive information.

2: MAC Layer Attacks:

* Denial of Service (DOS):- Attackers flood the Medium Access Control (MAC) layer with excessive signaling or data traffic, rendering the network.

* Spoofing :- Attackers may impersonate legitimate devices to gain unauthorized access to the network.

3 :- RRC (Radio Resource Control) Layer Attacks:

* Detach Attacks :- Attackers can exploit vulnerabilities in the RRC signaling to force a user to detach from the network.

* Tracking Area Update Attacks :- Malicious entities may manipulate the tracking area update process to track a user's location.

⇒ TO Improve Air interface security, various Countermeasures can be implemented:

* Strong Encryption Algorithms :-
Implement robust encryption algorithms to protect user data and communications.

* Secure Boot and Firmware Verification :-
Ensure that network elements and devices start up with trusted and authenticated software.

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : I		**Course Handling Faculty :** Dr. Uganya G		
1.	VTU19178	Kasireddy Hari Kishan Reddy	C	7.5
2.	VTU19603	Yaramala Bharath Kumar Reddy	C	AB
3.	VTU19737	Gunji Vamsi	C	AB
4.	VTU20409	Mukkera Gopi Chand Reddy	C	AB
5.	VTU20624	Yeddula Akhil	C	6.5
6.	VTU20844	Dasari Shanmuk Shandan	C	11
7.	VTU20896	Koduri Ajay Kumar	C	AB
8.	VTU20911	Varireddy Sai Kumar Reddy	C	2
9.	VTU21212	Chakali Anil Kumar	C	AB
10.	VTU21276	Mudedla Syam Deepak	C	9

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Lagging of solving the problems.
- The students were not writing the derivations properly.

Action Planned:

- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test and special class for slow learners.

G. Uganya
Faculty

Course Coordinator

HOD/ECE

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Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : I		**Course Handling Faculty :** Dr. Uganya G			
1.	VTU19178	Kasireddy Hari Kishan Reddy	AB	15.5	D
2.	VTU19603	Yaramala Bharath Kumar Reddy	15	01	D
3.	VTU19737	Gunji Vamsi	15	15	RA
4.	VTU20409	Mukkera Gopi Chand Reddy	15.5	15	D
5.	VTU20624	Yeddula Akhil	6	7	RA
6.	VTU20844	Dasari Shanmuk Shandan	AB	AB	RA
7.	VTU20896	Koduri Ajay Kumar	15	15.5	RA
8.	VTU20911	Varireddy Sai Kumar Reddy	9.5	15	D
9.	VTU21212	Chakali Anil Kumar	AB	15	RA
10.	VTU21276	Mudedla Syam Deepak	5.5	15	D

Action Taken:

- Slip test was conducted.
- Extra coaching classes were conducted.
- Instructed the students to present the answers in a legible way.

Improvements Observed:

- Out of ten slow learners four students passed in Test-2 and 7 students passed in Test-3 after repetitive coaching.

G. Uganya
Faculty

T. Kavitha
Course Coordinator

HOD/ECE

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table (17.08.2023-12.10.2023)

Course Code and Title : 10211EC112 / Wireless Communication

Section : I

Course Coordinator : Dr. Kavitha T

S. No	Date	Timing
1	17.08.2023	4.45 pm – 5.35 pm
2	22.08.2023	4.45 pm – 5.35 pm
3	24.08.2023	4.45 pm – 5.35 pm
4	30.08.2023	4.45 pm – 5.35 pm
5	04.09.2023	4.45 pm – 5.35 pm
6	07.09.2023	4.45 pm – 5.35 pm
7	13.09.2023	4.45 pm – 5.35 pm
8	19.09.2023	4.45 pm – 5.35 pm
9	27.09.2023	4.45 pm – 5.35 pm
10	05.10.2023	4.45 pm – 5.35 pm
11	09.10.2023	4.45 pm – 5.35 pm
12	12.10.2023	4.45 pm – 5.35 pm

Course Coordinator

HOD/ECE

SLOW LEARNERS

CLASS: B.Tech (ECE) SEM: Summer COURSE: 10211EC112 - WC

Roll No	Name	Month	August				September			
		Date	17	22	24	30	04	07	13	1[illegible]
VTU		Hour	8	08	8	8	8	8	8	8
19178	Kasimddy Hari Kishan Reddy		1	2	A	3	4	A	5	A
19603	Yaramala Bharath Kumar Reddy		1	A	2	3	A	A	4	5
19737	Gunji Vamsi		1	2	3	4	5	A	6	7
20409	Mukkera Gopi Chand Reddy		A	1	A	2	3	4	5	A
20624	Yedula Akhil		1	2	3	4	5	6	7	8
20844	Dasari Shanmuk Shandan		A	1	2	A	3	4	5	A
20896	Koduri Ajay Kumar		1	2	3	4	5	6	7	8
20911	Vaniveddy Sai Kumar Reddy		1	A	2	3	A	4	5	A
21212	Chakali Anil Kumar		1	2	3	4	5	6	7	8
21276	Mudedla Syam Deepak		A	1	A	2	3	A	4	5
	CLASS ACTIVITIES									
17.08.23	Test 1 QP discussion									
22.08.23	Revision of Unit 1 with problems									
24.08.23	Slip Test 1									
30.08.23	QPSK, π/4 QPSK, MSK									
04.09.23	Spread spectrum Techniques									
07.09.23	FH-SS, Fading									
13.09.23	Slip Test 2									
19.09.23	Unit 3 Revision									
27.09.23	Test 2 QP discussion									
05.10.23	Diversity Techniques									
09.10.23	Unit 4 Revision									
12.10.23	Multiple Access Techniques									
No of Absentees			3	2	3	1	2	4	0	4
Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

K. Ajay Kumar
VTU20896
course code - 10211EC112 - wireless communication

Slip Test - 1

1. **Frequency Reuse:** The ability to use the same frequencies repeatedly across cellular system. In each cell uses radio frequencies only within its bound - aries the same frequencies can be reused In other cells for away with a limited possibl - ity of interference.

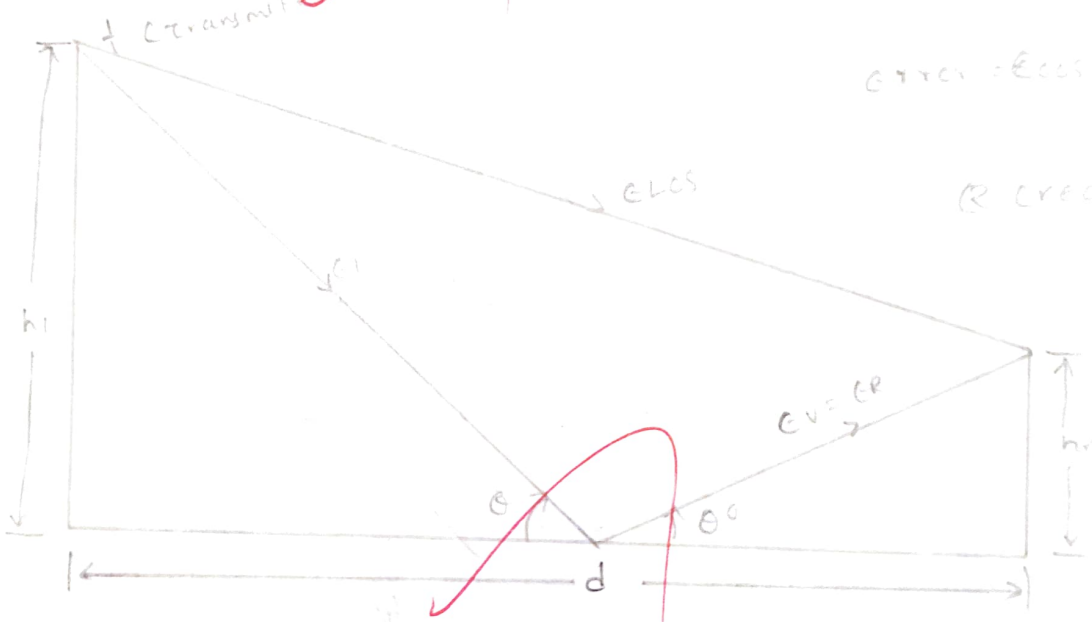


12/10
G. Uganya

* Frequency re-use - there are several cells that used two same set of frequencies
  - co-channel cells
  - co-channel interference
* To reduce co-channel interference co-channel cell must be seperated by a minimum distance.
* When the size of the cell is approximately the same
* co-channel interface is independent of the transmitted power.

2) Two Ray Model:

The two-rays ground reflection model is a multipath radio propagation model which predict the path losses blw a transmitting antenna and arecerving antenna when they are in line of sight (LOS) Generally the two antenna each have different height



* Total electric field is the sum of electric field of direct line of sight component

where:

is height of the transmitter

is height of the received

is free space electric field (V/m)

is reference distance

$$E(d,t) = \frac{E_0 d_0}{d} \cos(\omega_c t - d/c) \quad (d > d_0)$$

WIRELESS COMMUNICATION

SLIPTEST - I

K. Hari kishan Reddy

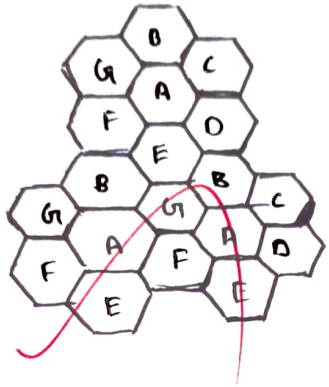
JTU19178

7/10

G. Uganya

Frequency reuse:

The ability to use the same frequencies repeatedly across a Cellular System. As each cell uses radio frequencies only within its boundaries, the same frequencies can be reused in other cells far away with a limited possibilities of interference.



- Frequency reuse: There are several cells that use the same set of frequencies
  - CO-Channel Cells.
  - Co-Channel interference.
- To reduce co-channel interference, co-channel cell must be separated by a min distance.
- when the size of the cell is approximately the same
  - Co-Channel interference is independent of the transmitted power.
  - Co-Channel interference is a function of
    - R. Radius of the cell
    - D. distance to the centre of nearest Co-Channel Cell

$$Q = D/R$$

Q is called Co-Channel Reuse Ratio.

- A small value of Q provides large capacity - larger value of Co-Channel interference.
- A large value of Q improves the transmission Quality - Smaller level of Co-Channel Interference

$$Q = \frac{D}{R} = \sqrt{3N}$$

Two-ray Ground Reflection model:

A two-ray model, which consists of two overlapping waves at the receiver, one direct path and one reflected wave from the ground. Total electric field is the sum of electric fields of direct line of sight (LOS). Generally the two antenna each have different height.

A two ray model, which consist of two-rays ground-reflection model is a multipath radio propagation model which predicts the path losses between a transmitting antenna and receiving antenna when they are in line of sight (LOS). Generally. The two antenna each have different height.

$E_{TOT} = E_{LOST} + E_g$

where,

h_t is height of the transmitter

h_r is height of the receiver.

E_0 is free space electric field (V/M)

d_0 is reference distance.

free space propagation of E-field is given by $(d > d_0)$

$$E(d,t) = \frac{E_0 d_0}{d} \cos\left(\omega_c \left(t - \frac{d}{c}\right)\right) \quad (d > d_0)$$

Direct wave travels at a distance d'

E field due to LOS.

$$E_{LOS}\, d', t = E_0 d_0 d' \cos(\omega_c t - d'c)$$

Reflected wave travels at a distance d''

E-field due to ground reflection, $E_{LOS} d'' t = \gamma E_0 d_0 d'' \cos(\omega_c t - d''c)$

Assume perfect horizontal E-field polarization ground reflection.

$\gamma = -1$

from equation

$$E_{TOTd}, t = E_0 d_0 d' \cos\omega_c t - d'c + (-1) E_0 d_0 d'' (\cos(\omega_c t - d''c)$$

Assume perfect horizontal E-field polarization

If $d >> (h_t + h_r)$

$$\Delta \approx \frac{2 h_t h_r}{d}$$

Phase difference,

Time difference,

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
WINTER 2022-2023

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr D.Ferlin Deva Shahila

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : J		**Course Handling Faculty : Dr D.Ferlin Deva Shahila**		
1.	VTU19353	VIGNESHVARAN VEL M	C	14
2.	VTU19483	ALLADA HEMANTH	C	AB
3.	VTU20277	SANJAY KRISHNAN T	C	14
4.	VTU20502	ASWIN S	C	14
5.	VTU20536	NARALA PRANAY KUMAR	C	9
6.	VTU20705	VENKAT DINESH KUMAR G	C	3
7.	VTU20734	KOTA JAY SRI RAM	C	AB
8.	VTU19839	MUVVA NIKHIL SAI	C	AB
9.	VTU21004	GUJJARLAPUDI JASWANTH NAGATEJA	C	AB
10.	VTU21005	ALLA HARSHAVARDHAN	C	AB
11.	VTU21047	KOLLURI VINAY KUMAR	C	AB
12.	VTU21158	TAMMISETTY MAHESH BABU	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

They didn't attend the exam.

Action Planned:

Give class test for practice.

Give revision after syllabus completion.

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
WINTER 2022-2023

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr D.Ferlin Deva Shahila

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : j		Course Handling Faculty : Dr.D.Ferlin			
1.	VTU19353	VIGNESHVARAN VEL M	7	17	RA
2.	VTU19483	ALLADA HEMANTH	AB	AB	RA
3.	VTU20277	SANJAY KRISHNAN T	15	AB	RA
4.	VTU20502	ASWIN S	13	AB	RA
5.	VTU20536	NARALA PRANAY KUMAR	12	21	D
6.	VTU20705	VENKAT DINESH KUMAR G	11	AB	RA
7.	VTU20734	KOTA JAY SRI RAM	AB	AB	RA
8.	VTU19839	MUVVA NIKHIL SAI	AB	15	RA
9.	VTU21004	GUJJARLAPUDI JASWANTH NAGATEJA	17	25	RA
10.	VTU21005	ALLA HARSHAVARDHAN	AB	AB	NE
11.	VTU21047	KOLLURI VINAY KUMAR	AB	23	RA
12.	VTU21158	TAMMISETTY MAHESH BABU	18	12	

Action Taken:
Gave important questions through question bank
Conducted special class for important topics

Improvements Observed: Seven students have shown their improvement in the test II and III.

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNER CLASS TIMETABLE

Course Title : Wireless Communication

Course Code: 10211EC112

Course Handling Faculty: Dr. D.Ferlin Deva Shahila (Sec – J)

Academic Year: 2023 – 2024

Course Coordinator : Dr. Kavitha. T

Semester : Winter

SL. NO	DATE	TIMING
1.	14-08-2023	4.45 PM to 5.45 PM
2.	30-08-2023	4.45 PM to 5.45 PM
3.	14-09-2023	4.45 PM to 5.45 PM
4.	26-09-2023	4.45 PM to 5.45 PM
5.	04-10-2023	4.45 PM to 5.45 PM
6.	12-10-2023	4.45 PM to 5.45 PM
7.	17-10-2023	4.45 PM to 5.45 PM
8.	19-10-2023	4.45 PM to 5.45 PM

Faculty

Course Coordinator

HoD

CLASS: J SEM.: SUMMER COURSE: WC

	Roll No	Name	Month								
		SLOW LEARNERS	Date	14/8	30/8	14/9	26/9	4/10	12/10	18/10	19/10
			Hour	8	8	8	8	8	8	8	8
				1	2	3	4	5	6	7	8
1	VTU19353	Vigneshvaran Vel		1	2	3	4	5	6	7	8
2	VTU19883	Allada Hemanth		1	2	3	a	4	5	6	7
3	VTU20377	Sanjan Krishnan. T		1	2	3	4	5	6	7	8
4	VTU20502	Aswin.S		1	2	3	4	5	6	7	8
5	VTU 20536	Narala Pranay Kumar		1	2	3	4	5	6	7	8
6	VTU20705	Venkat Dinesh Kumar		1	2	a	3	4	5	6	7
7	VTU20734	Kota Jay sri Ram		1	2	3	4	5	6	7	8
8	VTU 19839	Muvva Nikil Sai		1	2	3	4	5	a	6	7
9	VTU21004	JAswanth Nagateja		1	2	3	4	5	6	7	8
10	VTU21005	Alla Harshavardhan		1	2	3	4	5	6	7	8
11	VTU21047	Kolluri Vinay Kumar		1	2	a	3	4	5	6	7
12	VTU 21158	Tammisetty Mahesh Babu									
13											
14											
15											
16											
17		Faculty CC Signature									
18		Sign									
19		CLASS ACTIVITY:									
20	14/8/23	Unit-1 problem solving									
21	30/8/23	Test-1 QP discussion									
22	14/9/23	Slip test-1									
23	26/9/23	offset QPSK, GMSK									
24	4/10/23	Fading									
25	12/10/23	Slip test - 2									
26	18/10/23	Unit III Revision									
27	19/10/23	Test 2 - QP discussi									
	No. of Absentees			0	0	2	1	0	1	0	0
	Initials										

. 2023

VTU 20784 → kolo Jai Sri Ram

State the principle of diversity?

Diversity: it is the bitter technique used to compensate for fading channel impairments. it is used to Counter the effects of ISI, Diversity is usally employed to reduce the depth and duration of the fades experienced by a receiver in a flat fading channel. Thes techniques can be employed at both base station and mobile receivers Spatial diversity is the most widely

30/8/2023

Differentiate between macro diversity and micro diversity

Macro diversity	Micro diversity
In antenna (or micro) diversity the singal from antennas mounted at Separated locations are combined.	In site (or macro) diversity the receiving antennas are located at different receiver Sites.
These antennas are located on the vehicle or at the same base Station is a few wave lengths. The revevied Signal amplitude is correlated, depending on the antennas Separation to the	Signal from within a cell may be receviced at the different hexagonal area. The advantages is that not only the each branch, but that the shadow -ing and path to some

14-04-2023

Compute MIMO zero forcing receiver for the channel matrix H given as

$$H = \begin{bmatrix} 2 & 3 \\ 1 & 3 \\ 4 & 2 \end{bmatrix}$$

Solution :- from the above matrix it is known that the size is 3x2

→ Implying that the Number of received antenna r=3

Transmitting antenna t=2

$$\begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 1 & 3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} n_1 \\ n_2 \\ n_3 \end{bmatrix} \quad \text{---- (1)}$$

$$\left.\begin{aligned} y_1 &= 2x_1 + 3x_2 + n_1 \\ y_2 &= x_1 + 3x_2 + n_2 \\ y_3 &= 4x_1 + 2x_2 + n_3 \end{aligned}\right\} \quad \text{---- (2)}$$

$$G = (H^H H)^{-1} H^H \quad \text{---- (3)}$$

$$= \begin{bmatrix} -0.014 & -0.17 & 0.31 \\ 0.17 & 0.27 & -0.15 \end{bmatrix} \quad \text{---- (4) \& (5)}$$

$$\hat{x_1} = -0.04y_1 + 0.71y_2 + 0.31y_3$$

$$\hat{x_2} = 0.17y_1 + 0.27y_2 - 0.15y_3$$

MIMO System with N transmitter and M receiver antenna using diversity at transittors and receiver end. the matrix is $H\begin{pmatrix}1&0\\0&1\end{pmatrix}$ and the signal to Noise ratio is 251.

Solution :=

The Capacity of 2×2 MIMO channel is Calculated using the below formula

$$C = B \log_2 \left[\det\left(I_m + \frac{PS}{N}\right] HH^*\right)\right] \text{ bps}$$

The calculate the capacity

$$C = 10^6 \log_2 \left[\det\begin{pmatrix}1&0\\0&1\end{pmatrix} + 251\begin{pmatrix}1&0\\0&1\end{pmatrix} \times \begin{pmatrix}1&0\\0&1\end{pmatrix}\right]$$

$$= 10^6 \log_2 \left(\det\begin{pmatrix}1&0\\0&1\end{pmatrix} + 251\begin{pmatrix}1&0\\0&1\end{pmatrix}\right.$$

$$= 10^6 \log_2 \left(\det\begin{pmatrix}1&0\\0&1\end{pmatrix} + \begin{pmatrix}251&0\\0&251\end{pmatrix}\right.$$

$$C = 10^6 \log_2 \left(\det\begin{pmatrix}252&0\\0&252\end{pmatrix}\right.$$

(det → determinent of matrix H)

$$C = 10^6 \log_2 (252(252) - 0)$$

$$= 10^6 \log_2 63504$$

Applying the change of base formula

$$C = 10^6 \frac{\log_{10}(63504)}{\log_{10} 2} = 10^6 \times 15.955$$

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : K		Course Handling Faculty : Dr. Jency Rubia J		
1.	VTU19743	KUDUMULA ROHITH	C	9
2.	VTU19859	POOJARI UDAY PAVAN	C	5
3.	VTU19985	ASMA TABASSUM A	C	AB
4.	VTU20631	SIDDA SURYA VENKATA DURGA	C	AB
5.	VTU20819	B SHIVA PRASAD	C	AB
6.	VTU21032	PALADUGU GOPI	C	AB
7.	VTU21017	CHINTALA RAVI TEJA	C	8
8.	VTU21179	BETHAMCHARLA MANIKANTA	C	AB
9.	VTU20811	KOYA SRIRAM	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and most of them are late registration students.

Some of them absent for the exam.

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNER CLASS TIMETABLE

Course Title : Wireless Communication

Course Code: 10211EC112

Course Handling Faculty: Dr. Jency Rubia J (Sec – K)

Academic Year: 2023 – 2024

Course Coordinator : Dr. Kavitha. T

Semester : Summer

SL. NO	DATE	TIMING
1.	23-08-2023	4.45 PM to 5.45 PM
2.	24-08-2023	4.45 PM to 5.45 PM
3.	28-08-2023	4.45 PM to 5.45 PM
4.	29-08-2023	4.45 PM to 5.45 PM
5.	30-08-2023	4.45 PM to 5.45 PM
6.	04-09-2023	4.45 PM to 5.45 PM
7.	05-09-2023	4.45 PM to 5.45 PM
8.	07-09-2023	4.45 PM to 5.45 PM
9.	11-09-2023	4.45 PM to 5.45 PM
10.	12-09-2023	4.45 PM to 5.45 PM

Faculty

Course Coordinator

HoD

LIST OF SLOW LEARNERS

CLASS: K SEM.: V COURSE: WC

	Roll No.	Name	Month	← Aug →						← Se
			Date	23	24	28	29	30	4	5
			Hour	8	8	8	8	8	8	8
1	19743	Kudumala Rohith		P	P	P	P	P	P	P
2	19859	Uday Pavan		P	P	P	P	P	P	P
3	19985	A Surya Venkata Durga		P	A	P	A	P	P	P
4	20919	Shiva Prasad		P	P	P	P	P	P	P
5	21032	Paladugu Gopi		P	P	P	A	P	P	P
6	21017	Cintala Ravi Teja		P	P	P	P	P	P	A
7	21179	Bethamcharla Manikanta		P	P	P	P	P	P	P
8	20811	Koya Sriram		P	P	P	P	P	P	P
9	19985	Asma Tabassum A		P	P	P	P	P	P	P
10										
11										
12										
13		CLASS ACTIVITIES								
14										
15	23.08.23	Test-1 QP discussion								
16	24.08.23	Unit-1 Problem Solving Session								
17	28.08.23	Slip Test-1								
18	29.08.23	Offset QPSK, GMSK								
19	30.08.23	Fading								
20	4.09.23	Slip Test-2								
21	5.09.23	Unit-III Revision								
22	7.09.23	Diversity Techniques								
23	11.09.23	Unit-4 Problem solving								
24	12.09.23	Test-2 QP discussion								
25										
26										

Test-1

V. Kumara Swamy

Explain about CDMA ... ?

CDMA - stands for the code division multiple Access and it's a digital cellular technology used in mobile communication system. Here's a brif explanation.

8/10

1. multiple Access technology :—

CDMA is a techique that allows multiple user to share the same frequency spectrum simultaneously. This is in contrast to other technologies like GSM (Global system for mobile Communication), which use Time division multiple Access (TDMA) or Frequency Division multiple Access (FDMA) to achive the same goals.

2. spread Spectrum :—

CDMA achieves multiple multiple access by spreading the data of each user

3. Decoding:—

To transmit and recived data, a CDMA device uses is unique code when a reciver wants to capture a specific signal, it knows the code and the signal. It then multiplies the recived signal by the code, and the result is a replica of the original data.

Advantages:—

CDMA has several advantages including better call quality increased capacity to handle more users improved security:

2) Explain about FDMA...?

A) FDMA or frequency division multiple Access is a multiple access technology used in telecommunication and radio communication system Here's an explanation.

1. multiple Access technology :—

FDMA is a method for allowing multiple users or devices to share the available frequency spectrum. Simultaneously. it is one of the ways to divide the radio spectrum among users, the others being TDMA (Time division multiple Access) and CDMA (code multiple Access).

2. Frequency division :—

In FDMA, the frequency spectrum is divided into multiple non-overlapping subchannel of frequency bands. Each user or devices is allocated as specific frequency bands. Each user (or) device is allocated a specific frequency band within the spectrum for its communication. This means that different users transmit and receive on different frequency channels.

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : L		**Course Handling Faculty :** Dr. Ezhilazhagan C		
1.	VTU20869	AKKISETTY K SAI VENKTA KAMALESH	C	05
2.	VTU20883	JADAPOLU GURU JASWANTH SAI	C	09
3.	VTU20982	SHAIK RAFI AHMAD	C	AB
4.	VTU21075	VEMPALAKU DATTA SAI SAMPATH KUMAR YADAV	C	06
5.	VTU21090	KAKUMANI SRINU	C	02
6.	VTU21113	PRADEEPA G	C	AB
7.	VTU21114	VAISHNAVI K	C	AB
8.	VTU21275	SHAIK LATHEEF	C	13

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Lagging of solving the problems.
- The students were not writing the derivations properly.
- Students registration of courses were done two weeks before the test.

Action Planned:

- The answers for the questions will be discussed in class and will give practice to solve more problems.
- Planned to conduct more slip test and special class for slow learners.

Faculty (Dr. C. EZHILAZHAGAN)

Course Coordinator

HOD/ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : I		**Course Handling Faculty :** Dr.C.Ezhilazhagan			
1.	VTU20869	AKKISETTY K SAI VENKTA KAMALESH	AB	13	D
2.	VTU20883	JADAPOLU GURU JASWANTH SAI	10.5	14	C
3.	VTU20982	SHAIK RAFI AHMAD	13.5	AB	NE
4.	VTU21075	VEMPALAKU DATTA SAI SAMPATH KUMAR YADAV	AB	17	RA
5.	VTU21090	KAKUMANI SRINU	AB	09	D
6.	VTU21113	PRADEEPA G	10	04	AB
7.	VTU21114	VAISHNAVI K	13	16	D
8.	VTU21275	SHAIK LATHEEF	AB	AB	NE

Action Taken:

I) **Conducted Special Classes for the slow learners.**

II) **Conducted Test for the students by giving questions.**

Improvements Observed:

1. **Those who got less marks in Test 1, were able to get better marks in Test 2 and Test 3.**

Faculty **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table (17.08.2023-12.10.2023)

Course Code and Title : 10211EC112 / Wireless Communication

Section : K

Course Coordinator : Dr. Kavitha T

S. No	Date	Timing
1	17.08.2023	4.45 pm – 5.35 pm
2	22.08.2023	4.45 pm – 5.35 pm
3	24.08.2023	4.45 pm – 5.35 pm
4	30.08.2023	4.45 pm – 5.35 pm
5	04.09.2023	4.45 pm – 5.35 pm
6	07.09.2023	4.45 pm – 5.35 pm
7	13.09.2023	4.45 pm – 5.35 pm
8	19.09.2023	4.45 pm – 5.35 pm
9	27.09.2023	4.45 pm – 5.35 pm
10	05.10.2023	4.45 pm – 5.35 pm
11	09.10.2023	4.45 pm – 5.35 pm
12	12.10.2023	4.45 pm – 5.35 pm

Course Coordinator

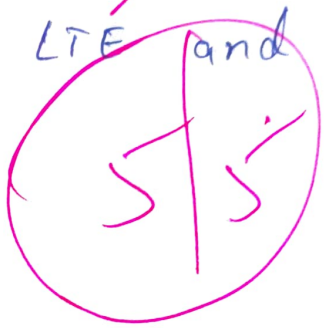
HOD/ECE

SLOW LEARNERS

	Roll No. VTU	Name	Month	Aug				SEP			
			Date	17	22	24	30	04	07	13	A
			Hour	8	8	8	8	8	8	8	8
1	20869	A. K. SAI VENKATA KAMALESH		/	/	/	/	/	/	/	a
2	20883	J. G. JASWANTH SAI		/	/	a	/	/	/	/	a
3	20982	RAFI AHMAD. S.		a	a	/	a	a	/	/	/
4	21075	V. D. S. SAMPATH KUMAR YADAV		a	/	/	/	/	/	/	a
5	21090	K. SRINU		/	/	/	/	/	/	/	a
6	21113	G. PRADEEPA		/	/	/	/	/	a	/	/
7	21114	K. YAISHNAVI		/	a	/	/	/	/	a	a
8	21275	SHAIK LATHEEF		/	/	a	a	a	a	a	a
9											
10											
11											
12		Topic Discussed.									
13	17/8/23	Two Ray model									
14											
15	22/8/23	Fading for Path loss.									
16											
17	24/8/23	Test-1									
18	30/8/23	MSK & Q MSK modulation.									
19	04/9/23	Diversity									
20	7/9/23	Rake receiver.									
21	13/9/23	MIMO systems.									
22											
23	19/9/23	Test-2									
24	22/9/23	4G Features & Challenges									
25	5/10/23	MIMO: SDMA, ALOHA.									
26	9/10/23	LTE System									
27	12/10/23	Test-3									
	No. of Absentees										
	Initials										

LTE System overview and physical channels :-

LTE (long-Term Evolution) is a wireless Communication standard that was developed to provide high-speed data and multimedia services to mobile devices. It is a 4G technology and a Successor to 3G networks. Here's an overview of LTE and its physical channels.



1) LTE Overview:-

*Technology:- LTE is a wireless broadband technology that operates based on OFDMA (orthogonal frequency Division Multiple Access) for the Down link and SC-FDMA for the uplink. This allows for high data rates and efficient use of the radio spectrum.

*Network Architecture:- LTE networks consist of various network elements including the core network and user equipment. The eNodeB is the base station and the core network handles the routing & Processing of data

Physical channels :-

* LTE uses a range of physical channels to facilitate communication. These channels serve different purposes and are crucial for the transmission of data and control information. Here are some of the main physical channels.

* Physical Broadcast channel (PBCH) :-

This channel is used for broadcasting essential system information such as cell identity and the basic system frame structure

* Physical Downlink Control (PDCH) :-

The PDCH carries control information for downlink data, such as resource allocation and transport format

* Physical Downlink Shared channel (PDSCH) :-

This channel carries used data and control information on the downlink.

* Physical Random access channel (PRACH) :- The PRACH is used for the initial access

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10213EC104 & Wireless Communication Networks

Course Coordinator : Dr.Helina Rajini Suresh

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr.Helina Rajini Suresh		
1.	VTU21364	SURENDHRA REDDY L V	C	10

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- He is irregular to the class.
- Lack of preparation by student.

Action Planned:

- Planned to conduct Special class for the student
- Planned to conduct slip test

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE
VTRUGE 2021 B.TECH
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10213EC104 & Wireless Communication Networks

Course Coordinator : Dr.Helina Rajini Suresh

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : S1		**Course Handling Faculty :** Dr.Helina Rajini Suresh			
1.	VTU21364	SURENDHRA REDDY L V	3	3	A3

Action Taken:

- Slip test conducted

Improvements Observed:

- VTU21364 has not shown any improvement in test II and test III

Faculty **Course Coordinator** **HOD Sign**

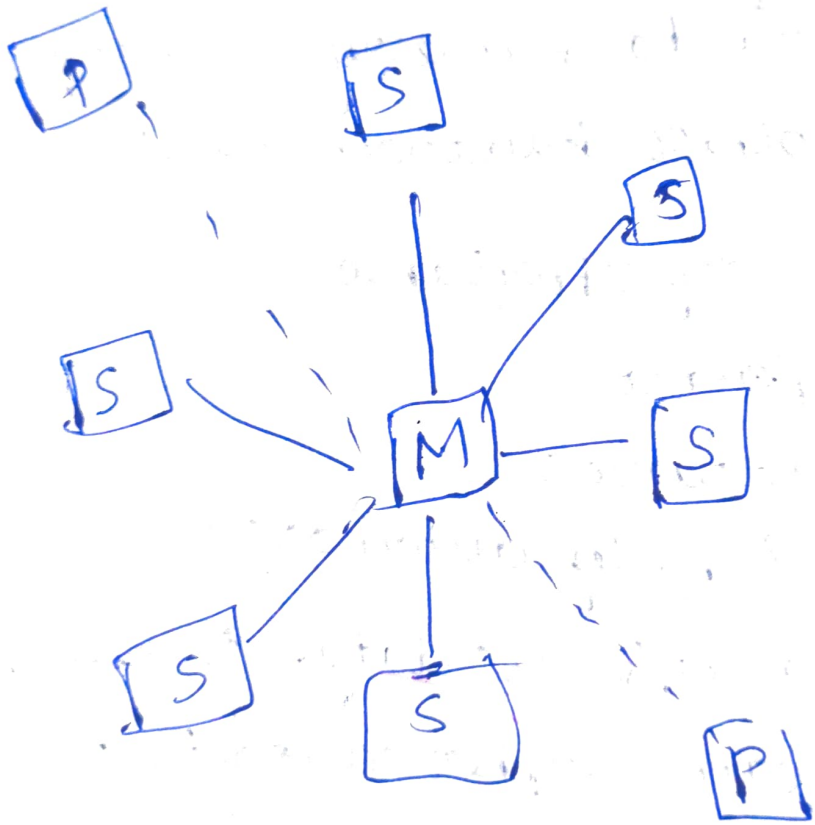
Bluetooth

VTU:- 21364 [redacted]

Bluetooth is a wireless technology that uses a radio frequency to share over a data over a short distance and eliminates the need of wires

* The Bluetooth range is 10meter
* It provides a data rates up to 1 Mbps.
* allows a device to wirelessly exchange data with other Bluetooth devices.
* Bluetooth is very affortable
* low interference
* personal network
* Bluetooth is fully automated
* Bluetooth encrypts its data transmissions with a stream cipher called E0.
* A Bluetooth network is called as pincot and collection of interconnected pincotnet is called Scatternet
* Manage multiple connections
* Establish RFCOMM channels
* Wireless PAN's 802.15

* Bluetooth is a network technology that connects mobile devices wirelessly over a short range a personal area network.



Master node-M

Slave node-S

parked node - P

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VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10213EC104/ Wireless Communication Networks

Course Coordinator : Dr. Jency Rubia J

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : E		**Course Handling Faculty : Dr. Jency Rubia J**		
1.	VTU20429	BOJJI REDDY GARI KARTHIK REDDY	C	AB
2.	VTU21296	TANNISHTHA BIPUL RAY	C	AB
3.	VTU23912	RAMYA J	C	18
4.	VTU24277	DINESH KARTHICK A	C	12
5.	VTU24286	ATMAKURI LEELA NAGA PREM CHAND	C	21

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

They didn't attend the exam.

Action Planned:

Give class test for practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

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VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr. Helina Rajni Suresh

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester
Section : K		Course Handling Faculty : Dr. Jency Rubia J			
1.	VTU26712	V UDAY KIRAN	AB	14	RA
2.	VTU24277	DINESH KARTHICK A	12	AB	AB
3.	VTU23281	SIVANESH M	AB	20	RA

Action Taken:
Gave important questions through question bank
Conducted special class for important topics
conducted slip test

Improvements Observed: Five students have shown their improvement in the test II and III.

Faculty **Course Coordinator** **HOD Sign**

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SLOW LEARNER CLASS TIMETABLE

Course Title : Wireless Communication Network
Course Code: 10211EC104
Course Handling Faculty: Dr. Jency Rubia J (Sec – E)
Academic Year: 2023 – 2024
Course Coordinator : Dr. Helina Rajni Suresh
Semester : Summer

SL. NO	DATE	TIMING
1.	03-08-2023	4.45 PM to 5.45 PM
2.	04-08-2023	4.45 PM to 5.45 PM
3.	10-08-2023	4.45 PM to 5.45 PM
4.	11-08-2023	4.45 PM to 5.45 PM
5.	12-08-2023	4.45 PM to 5.45 PM
6.	17-09-2023	4.45 PM to 5.45 PM
7.	07-09-2023	4.45 PM to 5.45 PM
8.	08-09-2023	4.45 PM to 5.45 PM
9.	22-09-2023	4.45 PM to 5.45 PM
10.	23-09-2023	4.45 PM to 5.45 PM

Faculty **Course Coordinator** **HoD**

M. Sivanesh
VTU: 23281

ALOHA (Pure ALOHA or unslotted ALOHA)

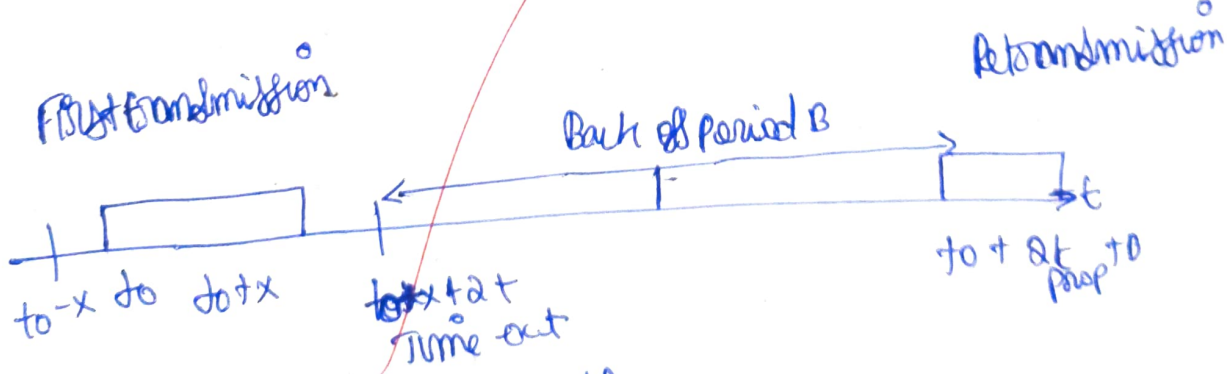
* It was developed at the university of Hawaii in the early 1970s to connect computers on different Hawaiian islands

* the computers of the ALOHA network transmit on the same radio channel whenever have a packet to transmit

* ALOHA is the father of multiple access protocols

ALOHA protocol

1. A user transmits whenever it has data to transmit
2. If more that one frames are transmitted, they interfere with each other (collide) and are lost
3. If ACK not received within timeout, then a user picks random back off time (to avoid repeated collision)
4. user retransmits frame after back off time

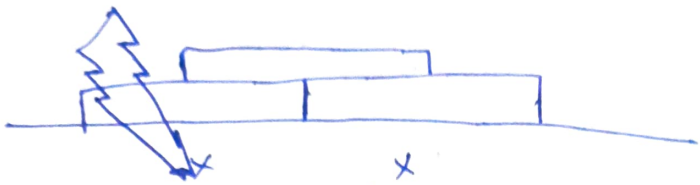


ALOHA Model

* Definitions and assumptions
  - x : frame transmission time (assume constant)
  - S : throughput (average # successful frame transmissions per x seconds)
  - G : load (average # transmission attempts per x sec.)

- P success : probability a frame transmission is successful

S = TRP success



Prior Interval frame transmission

- Any transmission that beginning during vulnerable period
- success if no arrival during 2x seconds

Abramson's Assumption

- What is probability of no arrivals in vulnerable period?
- Abramson assumption : aggregate traffic arrival that result from new arrivals and retransmissions has a poisson distribution w
- Abramson assumption : aggregate ~~an~~ number of arrivals of G arrivals K (Effect of back off algorithm is that frame arrivals are equally likely to occur at any time interval)

Pt (K transmissions 2x seconds = $\frac{(2G)^2_c}{kt}$ = 2G k = 0,2 (on average 2G arrivals / 2x seconds)

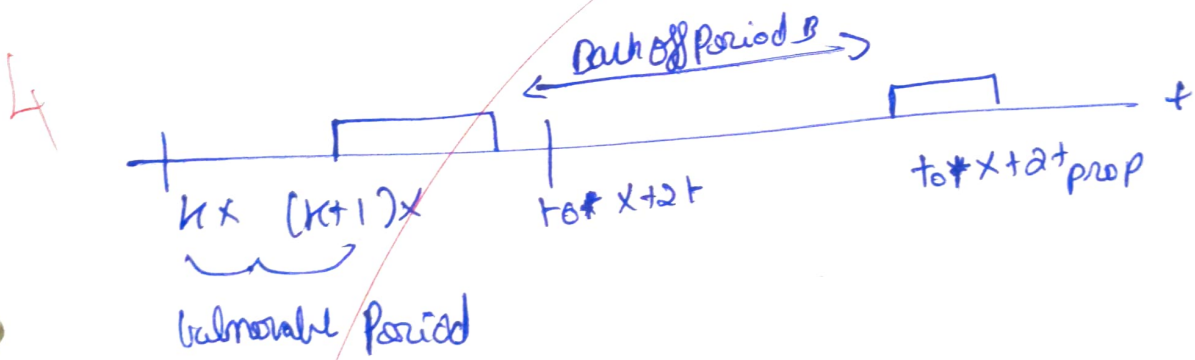
The probability a successful transmission is the probability that there are no additional packet transmission in the vulnerable period (2x)

Slotted ALOHA

M. Sivanesh
UTV: 23281

Protocol

1. Time is slotted in x seconds slots
2. Users synchronized to from times
3. Users transmit frames in first slot from arrival
4. Back off intervals in multiples of slots



Only frames that arrive during prior x seconds collide

Example of Slotted Aloha

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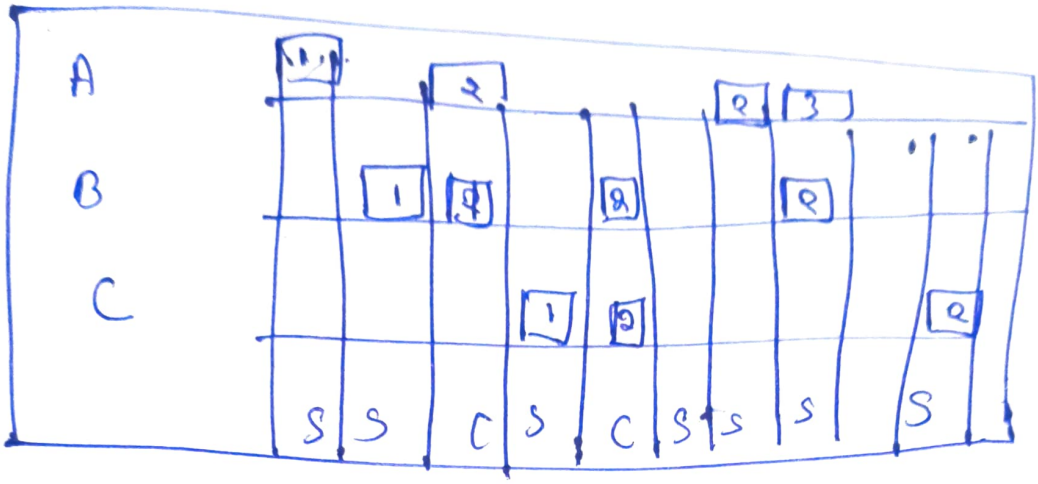
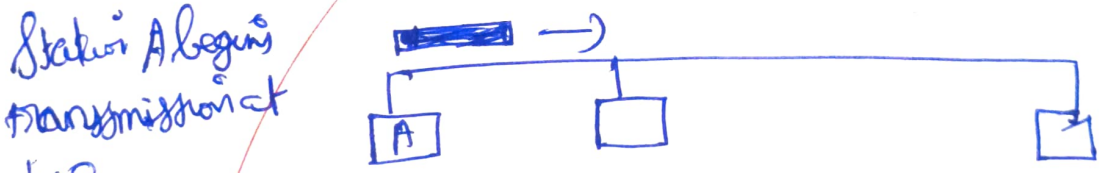
VTU: 23281



S = Success, C = Collision

Carrier Sense Multiple Access (CSMA)

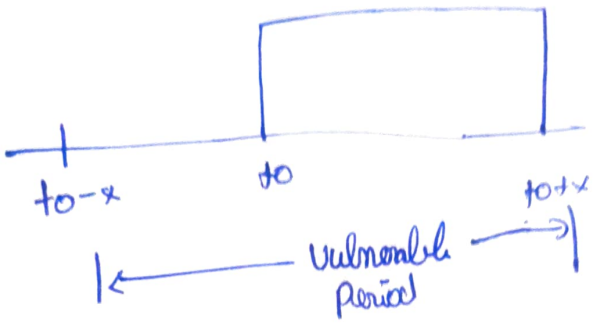




CSMA Options



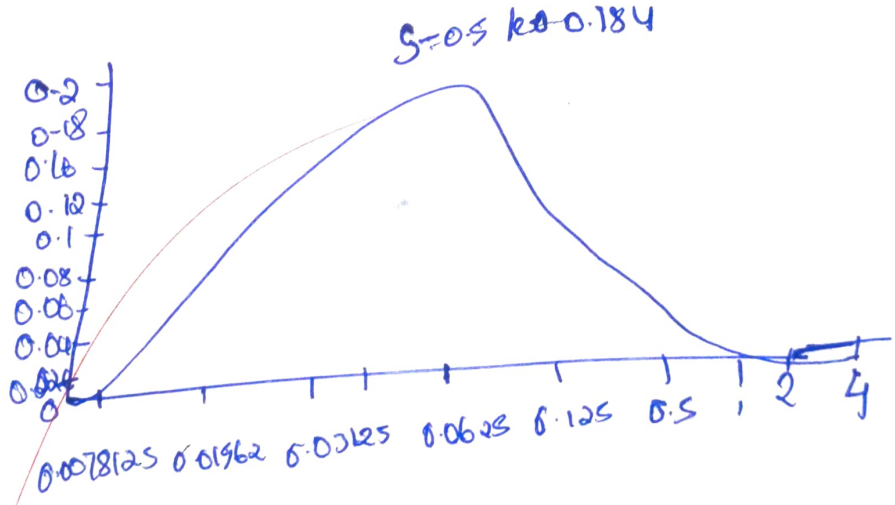
M. Sivansh
VTU: 23281



the throughputs = GPo (no Collision)
= GPo (transmission in 2 x seconds)

$$G = \frac{(2G)^0}{0!} e^{-2G}$$

$$= Ge^{-2G}$$



3

4. observation

* throughput S reaches a peak value of 0.5/e at load G=0.5 and then declines both sword

* ALOHA System cannot achieve throughput higher than 18.4 Percent (0.5/e)

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Slow Learners Remedial Class Time Table

Course Title : Antenna Theory
Course Handling Faculty: Dr.Beulah Jackson
Course Coordinator : Dr. M.Anto Bennet

Course Code:10211EC113
Academic Year: 2023-2024
Semester : Summer

Date	Time
05.09.2023	4.45 PM – 5.35 PM
12.09.2023	4.45 PM – 5.35 PM
19.09.2023	4.45 PM – 5.35 PM
03.10.2023	4.45 PM – 5.35 PM
10.10.2023	4.45 PM – 5.35 PM
17.10.2023	4.45 PM – 5.35 PM

Faculty

Course Coordinator

HOD ECE

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VTU R21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners - Action Planned Report

Course Code and Title :10211EC113/Antenna Theory

Course Coordinator : Dr.M.Anto Bennett

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test 1
Section : B		Course Handling Faculty : Dr.Beulah Jackson		
1.	VTU19316	KOTHAPALLI CHANDRA NITHIN	C	AB
2.	VTU19542	KV S NAGA SAI HARSHAVARDHAN	C	0
3.	VTU19603	Y BHARATH KUMAR REDDY	C	AB
4.	VTU19737	GUNJI VAMSI	C	AB
5.	VTU19859	POOJARI UDAY PAVAN	C	AB
6.	VTU20409	MUKKERA GOPI CHAND REDDY	C	AB
7.	VTU20678	G V V DURGA RAGHAVA AKHIL	C	0
8.	VTU20717	MUNDLURU PURNAKISHORE	C	2
9.	VTU20739	VEGURU PREM CHAND	C	0
10.	VTU20893	SANGATHALA NAGA NITHIN KUMAR	C	AB
11.	VTU20896	KODURI AJAY KUMAR	C	AB
12.	VTU20904	ERIGELA MALLIKARJUNA REDDY	C	22
13.	VTU20949	MANNAM PURNA CHANDU	C	1
14.	VTU20982	SHAIK RAFI AHMAD	C	AB
15.	VTU20993	THADIKAMALLA ADITYA	C	0
16.	VTU21004	G JASWANTH NAGATEJA	C	AB
17.	VTU21233	DAVU SAI KUMAR	C	AB
18.	VTU21234	PULI THARUN MANIKANTA SAI	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1(including absentees)

Reason for Low Performance:

1. Irregular to class.
2. Didn't prepare for test.

Action Planned:

1. Revision of important topics
2. To conduct slip test

Faculty **Course Coordinator** **HOD/ECE**

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DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC113/Antenna Theory

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : B		Course Handling Faculty : Dr.Beulah Jackson			
1.	VTU19316	KOTHAPALLI CHANDRA NITHIN	1	4	NE
2.	VTU19542	KV S NAGA SAI HARSHAVARDHAN	AB	AB	NE
3.	VTU19603	Y BHARATH KUMAR REDDY	5	11	NE
4.	VTU19737	GUNJI VAMSI	6	6	NE
5.	VTU19859	POOJARI UDAY PAVAN	0	2	RA
6.	VTU20409	MUKKERA GOPI CHAND REDDY	4	13	RA
7.	VTU20678	G V V DURGA RAGHAVA AKHIL	0	8	NE
8.	VTU20717	MUNDLURU PURNAKISHORE	2	14	D
9.	VTU20739	VEGURU PREM CHAND	1	15	RA
10.	VTU20893	S NAGA NITHIN KUMAR	AB	3	NE
11.	VTU20896	KODURI AJAY KUMAR	0	4	NE
12.	VTU20904	E MALLIKARJUNA REDDY	15	15	C
13.	VTU20949	MANNAM PURNA CHANDU	5	0	D
14.	VTU20982	SHAIK RAFI AHMAD	4	10	D
15.	VTU20993	THADIKAMALLA ADITYA	0	0	NE
16.	VTU21004	G JASWANTH NAGATEJA	0	10	NE
17.	VTU21233	DAVU SAI KUMAR	2	5	RA
18.	VTU21234	PULI THARUN MANIKANTA SAI	0	5	RA

Action Taken:
Remedial Classes were conducted, Revision of important topics and slip tests were conducted.

Improvements Observed: Two students have shown improvement in Test-3.

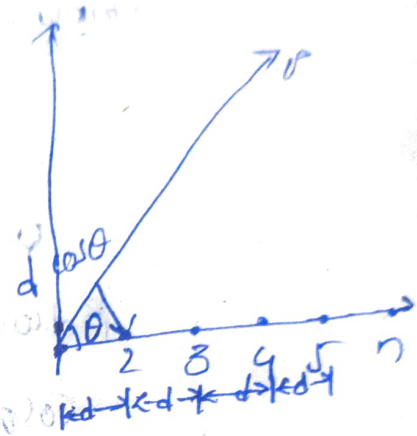
Faculty **Course Coordinator** **HOD/ECE**

Purna chandu
VTU 20949

Broadside array

Consider a linear array of 'n' isotropic point source of same amplitude and phase.

Path difference is $d\cos\theta$



Phase difference ψ in

$\psi = 2\pi \times$ Path difference

$\psi = 2\pi \times \frac{d\cos\theta}{\lambda}$

$= \beta d\cos\theta \quad (\because \beta = \frac{2\pi}{\lambda})$

$\psi = \beta d\cos\theta$ radias

Let α in the phase difference in adjacent point source

$$\therefore \psi = \beta d\cos\theta + \alpha \quad \text{---(1)}$$

i) Maximum direction of major to be: In the BSA all the elements are fed with the current of equal amplitude and phase and maximum radiation

for Broadside array $\alpha = 0$,

$\therefore \psi = \beta d\cos\theta$

Since the field form all the source reach to distant point at same constant of time $\psi = 0$

$$\beta d\cos\theta = 0$$

$$\cos\theta_{max} = 0$$

$$\theta_{max} = \cos^{-1}(0)$$

$$\theta_{max} = 90^\circ, 270^\circ \quad \text{---(2)}$$

TION

rmance of the student

Test I
08
AB
AB
10
10
AB
11
AB
AB
10
13
11
06
04
AB

ero

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VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024
List of Slow Learners – Action Planned Report

Course Code and Title : **10211EC113 ANTENNA THEORY**
Course Coordinator : **Dr.M.Anto Bennet**

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : D sec		Course Handling Faculty : **Dr.M.ANANDAN**		
1.	VTU19418	SAKTHIKUMAR S	C	08
2.	VTU19743	KUDUMULA ROHITH	C	AB
3.	VTU19959	MANEPALLI VENKATA SAI KRISHNA	C	AB
4.	VTU20502	ASWIN S	C	10
5.	VTU20693	KESULAPPAGARI JAYANTH NAIDU	C	10
6.	VTU20714	MULI NANDAKISHORE REDDY	C	AB
7.	VTU20746	SANNEBOYINA JAYA KRISHNA	C	11
8.	VTU20992	GORLA UMESH CHANDRA	C	AB
9.	VTU21003	S VENKATA SURYA PRAKASH ROYAL	C	AB
10.	VTU21102	VANGA ADI VISHNU MANIKANTA	C	10
11.	VTU21018	LAKSHMI NAGA VENKAT	C	13
12.	VTU21032	PALADUGU GOPI	C	11
13.	VTU21135	SAI RAGHU RAMA VARMA PENTAPATI	C	06
14.	VTU21191	PASUPULETI SAI RAM	C	04
15.	VTU21253	SAMMUTURU VISHWANATH	C	AB

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:
- Late Registration
- Irregular to classes
- Last minute preparation

Action Planned:
1. Extra classes
2. Slip test

Faculty **Course Coordinator** **HOD Sign**

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DEPARTMENT OF ECE

VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024
List of Slow Learners – Action Taken Report

Course Code and Title: 10211EC113 ANTENNA THEORY
Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : **D sec**		Course Handling Faculty : **Dr.M.ANANDAN**			
1.	VTU19418	SAKTHIKUMAR S	15	AB	RA
2.	VTU19743	KUDUMULA ROHITH	15	18	D
3.	VTU19959	MANEPALLI VENKATA SAI KRISHNA	10	25	D
4.	VTU20502	ASWIN S	07	AB	RA
5.	VTU20693	KESULAPPAGARI JAYANTH NAIDU	10	20	D
6.	VTU20714	MULI NANDAKISHORE REDDY	12	24	AB
7.	VTU20746	SANNEBOYINA JAYA KRISHNA	AB	AB	NE
8.	VTU20992	GORLA UMESH CHANDRA	AB	10	RA
9.	VTU21003	S VENKATA SURYA PRAKASH ROYAL	15	21	RA
10.	VTU21102	VANGA ADI VISHNU MANIKANTA	10	19	RA
11.	VTU21018	LAKSHMI NAGA VENKAT	11	15	RA
12.	VTU21032	PALADUGU GOPI	12	23	D
13.	VTU21135	SAI RAGHU RAMA VARMA PENTAPATI	10	19	RA
14.	VTU21191	PASUPULETI SAI RAM	11	22	D
15.	VTU21253	SAMMUTURU VISHWANATH	16	14	D

Action Taken:
1. Slip test was conducted.
2. Extra classes were conducted

Improvements Observed: No of Student Pass: '4' in Test II, '10' in Test III

Faculty **Course Coordinator** **HOD Sign**

K. Rohith
VTU19743

1. Define Ground wave propagation
2. List out the features of ground wave propagation
3. What are the uses of ground wave propagation
4. What is space wave propagation.
5. Why space wave propagation is called as of line of sight
6. Define tropospheric wave
7. What is Ionosphere
8. Classify the different types of layers present in ionosphere
9. List out the application of troposcatter.
10. List out the uses of troposcatter.

1. The propagation of electromagnetic waves near the surface of earth including propagation in the troposphere is called ground wave propergation

2. It exists for vertically polarized antennas
They are not affected by the changes in atmospheric conditions
Ground waves required relatively high transmitting power

3. It is suitable for very low frequency (VLF), (LF) and (MF) communications.
Freq range can be 15 Hz to 2 MHz
[illegible] navigation.

(4). The propagation of electromagnetic waves in space is called space wave propagation
It is also known as line of sight propagation

(5). Space wave propagation is also called as line of sight propagation because for transmitting and recieving antennas must be able to see other

(6). waves that arrive at the reciever after reflection from the troposphere region is called trophospheric wave

(7). Ionosphere is the region of upper atmosphere that extends from 30 miles above the earth is called ionosphere.

(8). D layer
E layer
sporadic E layer and F layer

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VTU R21 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC113 – Antenna Theory

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Category	Performance of the student in CIA Test - I
Section : C		**Course Handling Faculty :** Dr C.Kanmani Pappa		
1.	VTU21077	YARRAPOTHU PAVAN ADITHYA	C	AB
2.	VTU24014	KOSURU LALITH SAI	C	AB

Reason for Low Performance:

Find difficulty in doing the derivation

Action Planned:

Guide them on how to approach a question and how to write them properly.

Regular slip test to be conducted.

Faculty
Dr. Kanmani

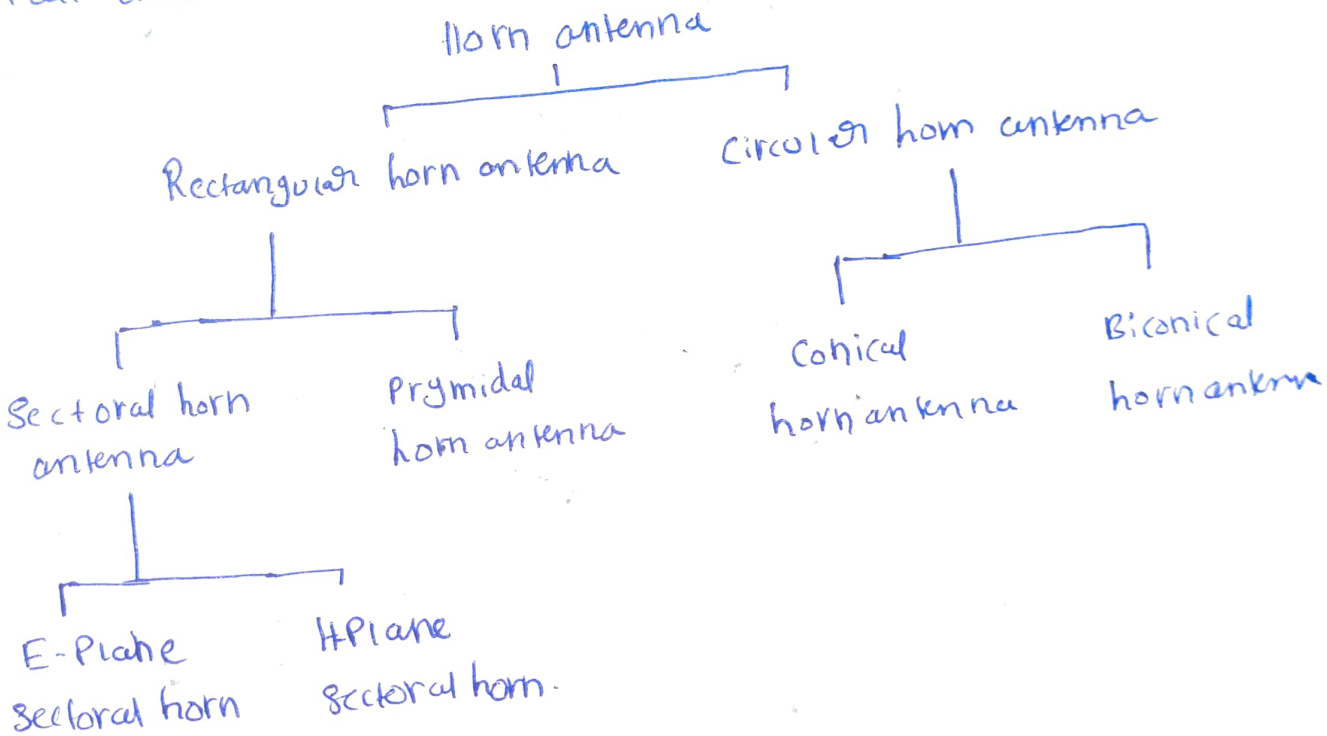
Course Coordinator

HOD Sign

Antenna

One of the simplest and probably the most widely used microwave antenna is the horn and may be considered as an aperture antenna.

A horn antenna may be regarded as a flared out or opened out wave guide. When one end of the waveguide is excited and other end is kept open, it radiates in open space in all direction.



Rectangular horn antenna:

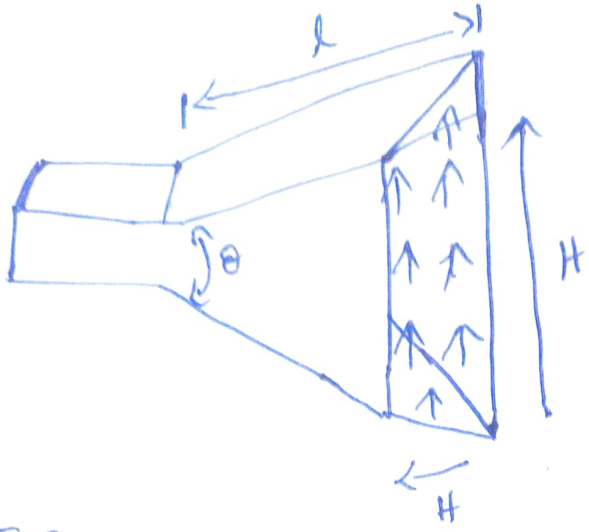
1 Sectoral horn antenna

1. E-Plane sectoral horn - flaring is done in the direction of the electric field vector

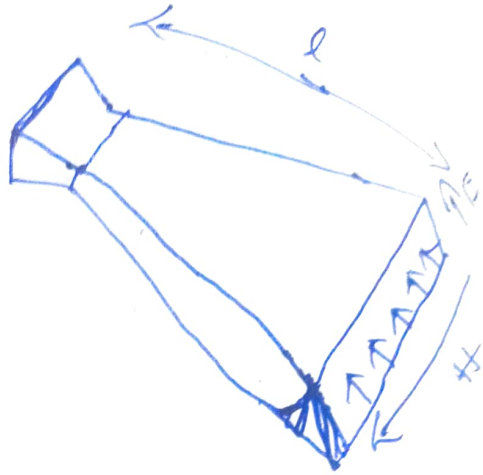
2. H-Plane sectoral horn - flaring is done in the direction of the magnetic field vector.

H-Plane Sectoral h...

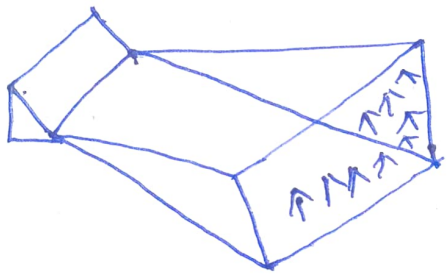
Broad side



E Plane sectoral horn

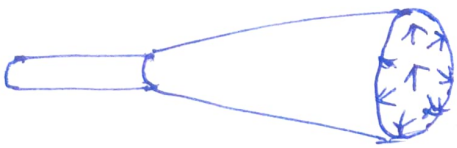


Pyramidal horn antenna - Flaring is done in the direction of both the electric field and magnetic field.

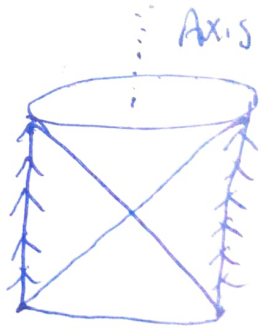


pyramidal horn antenna

Circular horn antenna



Conical horn

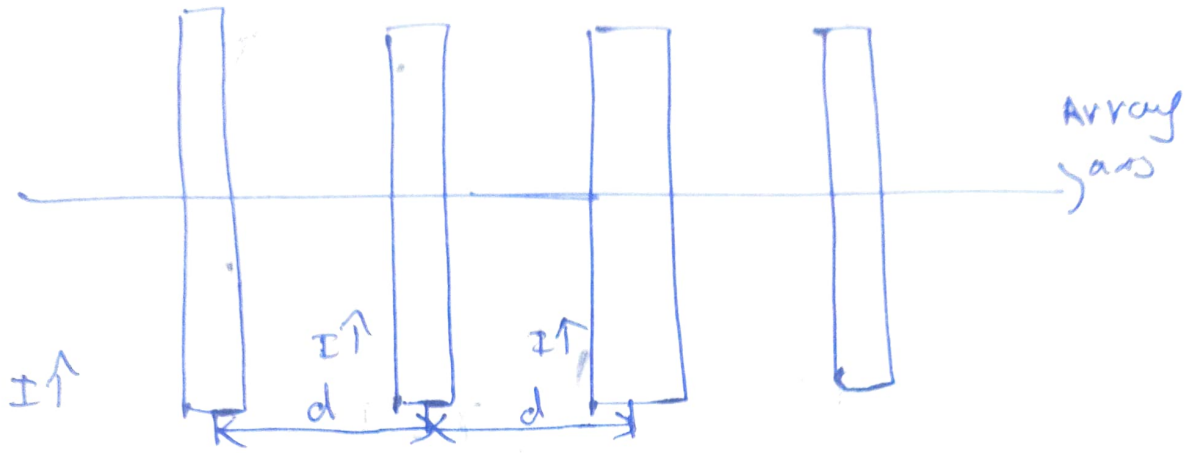


Biconical horn

Principle of horn antenna

Huygens principle says that each point on a primary wave form can be considered to be a new source of a secondary wave and the secondary wave form can be constructed by the envelope of these secondary spherical waves.

Broad side array



$\psi = \beta d \cos\theta + \alpha$

ψ -> total phase difference to n element array

α -> phase difference due to adjacent point source

for equal magnitude & inphase current

$\alpha = 0, \psi = 0$

$\psi = \beta d \cos\theta + \alpha$

$0 = \beta d \cos\theta + 0$

$\beta d \cos\theta = 0 \Rightarrow \cos\theta = 0$

$\theta = \cos^{-1}(0)$

$\theta_{max} = 90^\circ, 270^\circ$

$E_T = E_0 \frac{\sin\left(\frac{n\psi}{2}\right)}{\sin\left(\frac{\psi}{2}\right)}$

$\sin\left(\frac{n\psi}{2}\right) = \pm 1$

$\frac{n\psi}{2} = \sin(\pm 1)$

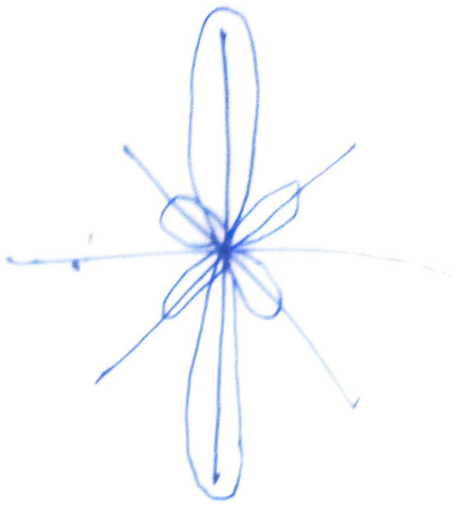
$\frac{n\psi}{2} = \pm (2N+1)\frac{\pi}{2}$

$\beta d \cos\theta = \pm (2N+1)\frac{\pi}{2}$

$\theta_{max} = \cos^{-1}\left(\pm \frac{(2N+1)\lambda}{2nd}\right)$

$$\theta_{max} = \cos^{-1}\left(\frac{\pm (2N+1)\lambda}{2nd}\right)$$

$$\theta_{max} = \cos^{-1}\left[\pm\left(\frac{2N+1}{n}\right)\right]$$



for N = 1 n = 4 (Given)

$$E_T = \frac{E_0 \sin\left(\frac{n\psi}{2}\right)}{\sin\left(\frac{\psi}{2}\right)}$$

$$\sin\left(\frac{n\psi}{2}\right) = 0$$

$$\frac{n\psi}{2} = \sin^{-1}(0)$$

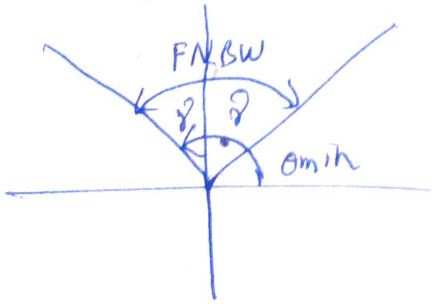
$$\frac{n\psi}{2} = \pm N\pi$$

$$\psi = \pm \frac{2N\pi}{n}$$

$$\cos\theta = \pm \frac{2N\pi}{n} \cdot \frac{\lambda}{2\pi d}$$

$$\cos\theta = \pm \frac{2N\pi}{n} \cdot \frac{\lambda}{2\pi d}$$

BFWN / FNBW



$$\theta_{min} = \cos^{-1}\left(\pm \frac{N\lambda}{nd}\right)$$

$$\gamma = 90^\circ - \theta_{min}$$

$$90^\circ - \gamma = \theta_{min}$$

$$90^\circ - \gamma = \cos^{-1}\left(\pm \frac{\lambda}{nd}\right)$$

$$\cos(90^\circ - \gamma) = \pm \frac{\lambda}{nd}$$

$$\sin\gamma = \pm \frac{\lambda}{nd}$$

$\sin\gamma = \gamma$ (γ is small)

$$\boxed{\gamma = \pm \frac{\lambda}{nd}}$$

$\sin\theta = \theta$ (θ is small)

$$FNBW = 2\gamma$$

$$= 2\left[\frac{\lambda}{nd}\right]$$

$$= \frac{2\lambda}{nd}$$

$$\boxed{FNBW = \frac{2\lambda}{L}} \quad (\because L = nd)$$

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DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Planned Report

Course Title: **Antenna Theory**
Date after Test-1: **28/08/2023**
Academic Year: **2023 - 2024**
Course Code:**10211EC113**
Course Coordinator: **Dr.M.Anto Bennet**
Semester: **Summer**
Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

Sl.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 1	Category
1.	20273	JYOTHI JAGADEESHWAR REDDY	6	C
2.	20631	SIDDA SURYA VENKATA DURGA	8	C
3.	20884	NAKKA VENKATA SAI KRISHNA	8	C
4.	20939	KAMANI RAMA KRISHNA	0	C
5.	20969	DUDALA SIVA SANKAR REDDY	5	C
6.	21073	PUJARI HEBBATAM VINOD KUMAR	7	C

Reason for Low Performance: Lack of practice from students side leads to low scores in this exam, especially to the certain CO levels.

Action Planned: As a remedial measure, more number of questions (theory and problems) associated with the topics to be solved in the allocated class. Motivation will be provided to them for overcoming this limitation.

Course Handling Faculty Course Coordinator HOD ECE

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DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Planned Report

Course Title: **Antenna Theory**
Academic Year: **2023 - 2024**
Course Coordinator: **Dr.M.Anto Bennet**
Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

Date after Test-2: **09/10/2023**
Course Code: **10211EC113**
Semester: **Summer**

S.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 2	Category
1.	19475	SIRIGIRI YASWANTH SAI	0	C
2.	19958	CHIRAYYAGARI LAKSHMI REDDY	9.5	C
3.	20273	JYOTHI JAGADEESHWAR REDDY	0	C
4.	20754	KURUVA DURGA PRASAD	9	C
5.	20778	NAVEEN KUMAR	0	C
6.	20884	NAKKA VENKATA SAI KRISHNA	0	C
7.	20885	BANDARU ANAND JAGAN MOHAN RAO	13	C
8.	21114	VAISHNAVI K	0	C
9.	21128	PUNEETH KUMAR H	0	C
10.	21142	HARISH R	0	C
11.	23941	RAJESH S	0	C
12.	24102	SHUBHAM GOLDER	0	C

Reason for Low Performance: Lack of practice from students side leads to low scores in this exam, especially to the certain CO levels.

Action Planned: As a remedial measure, more number of questions (theory and problems) associated with the topics to be solved in the allocated class. Motivation will be provided to them for overcoming this limitation.

Course Handling Faculty | Course Coordinator | HOD ECE

[illegible]OW LEARNERS

[illegible] II YEAR [illegible] 5TH [illegible] ANTENNA THEORY

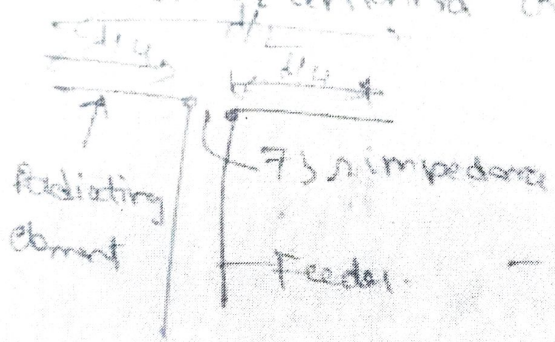
		[illegible]							
		08	11	13	1[illegible]	19	06	09	11
		VIII	VIII	VII	VII	VII	VIII	VIII	VII
19475	SIRIGIRI VAIWANTH SAI	1	2	3	4	5	6	7	8
19958	CHIRAYYAGARI LAKSHMI REDDY	1	2	3	4	[illegible]	6	7	8
20[illegible]	JYOTHI JAGADEESHWAR REDDY	A	[illegible]	1	2	3	4	5	6
20[illegible]1	[illegible]DDA SURYA VENKATA DURGA	1	2	A	3	4	5	6	7
20[illegible]4	KURUVA DURGA PRASAD	1	2	3	4	5	6	7	8
20779	NAVEEN KUMAR	1	2	3	4	5	6	7	8
20884	NAKKA VENKATA SAI KRISHNA	1	2	3	4	5	6	7	8
20[illegible]	BANDARU ANAND JAGAN MOHAN RAO	1	2	3	4	5	6	7	8
20[illegible]	NAMANI RAMA KRISHNA	1	2	3	4	5	6	7	8
20969	DUDALA SIVA SHANKAR REDDY	A	1	2	A	3	4	4	5
21075	PUTARI HEBBATAM VINOD KUMAR	1	A	A	2	3	4	4	5
21114	VAISHNAVI K	A	1	2	3	4	5	6	7
21128	PUNEETH KUMAR H	1	[illegible]	2	3	[illegible]	[illegible]	[illegible]	[illegible]
21142	HARISH R	1	A	A	2	3	4	5	6
23941	RATEHS	1	2	3	4	5	6	7	8
24102	SHURHAM GOLDER	1	2	3	4	5	6	[illegible]	8

HALF WAVE DIPOLE ($\lambda/2$ Antenna)

The half wave dipole means half wavelength dipole ($\lambda/2$)

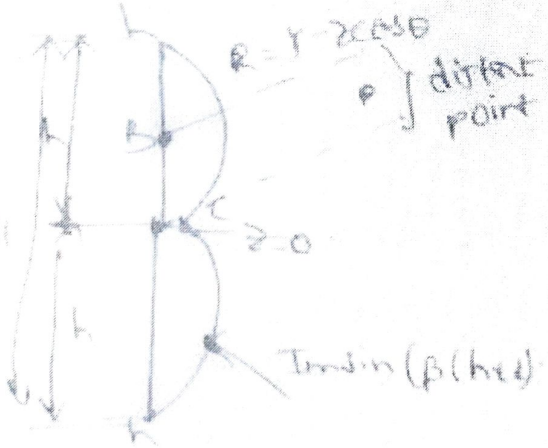
It is one of the simplest antenna and is frequently employed as an element of the antenna array

It is known as Hertz antenna or half wave doublet



– Half wave dipole antenna

Power Radiation From half wave Dipole



In ΔABC, $AC = r - R$

$\frac{r-R}{z} = \cos\theta$

$r - R = z\cos\theta$

$\boxed{R = r - z\cos\theta}$

Current distribution

$$\left.\begin{array}{l} I_m \sin\beta(h-z) \text{ for } z > 0 \\ I_m \sin\beta(h+z) \text{ for } z < 0 \end{array}\right\} \quad (1)$$

where

I_m current maximum at the [illegible]

$h = \frac{\lambda/4}{2}$ phase constant, and

$$dA_z = \frac{\mu}{4\pi R} I d_z e^{-j\beta R}$$

R = distance b/w Id_z to distant point P

The total vector potential

$$A_z = \int_{-h}^{0} \frac{\mu I d_z e^{-j\beta R}}{4\pi R} + \int_{0}^{h} \frac{\mu I d_z e^{-j\beta R}}{4\pi R}$$

$$A_z = \frac{\mu}{4\pi} \int_{-h}^{0} \frac{I_m \sin\beta(h+z) e^{j\beta R}}{R} dz + \frac{\mu}{4\pi} \int_{0}^{h} \frac{I_m \sin\beta(h-z) e^{-j\beta R}}{R} dz \quad \text{(3)}$$

R is at long distance, point P may be assumed to be parallel

$$\boxed{R = r - z\cos\theta}$$

$$A_z = \frac{\mu}{4\pi} \int_{-h}^{0} \frac{I_m \sin\beta(h+z)}{r} e^{-j\beta(r - z\cos\theta)} dz + \frac{\mu}{4\pi} \int_{0}^{h} \frac{I_m \sin\beta(h-z)}{r} e^{-j\beta(r - z\cos\theta)} dz$$

$$A_z = \frac{\mu I_m e^{-j\beta r}}{4\pi r} \left[\int_{-h}^{0} \sin\beta(h+z) e^{j\beta z\cos\theta} dz + \int_{0}^{h} \sin\beta(h-z) e^{j\beta z\cos\theta} dz \right]$$

For $\lambda/2$ antenna, $L = 2h = \lambda/2$ & $z = h = \lambda/4 = \pi/2$ degree

$$\sin\beta(h+z) = \sin\beta\left(\frac{\pi}{2} + z\right) = \cos\beta z \qquad \left[h = \pi/2\right]$$

$$\sin\beta(h-z) = \sin\beta\left(\frac{\pi}{2} - z\right) = \cos\beta z$$

$$A_z = \frac{\mu I_m e^{-j\beta r}}{4\pi r} \left[\int_{-h}^{0} \cos\beta z e^{j\beta z\cos\theta} dz + \int_{0}^{h} \cos\beta z e^{+j\beta z\cos\theta} dz \right]$$

Now $\int_{-h}^{0} e^{-j\theta} d\theta = \int_{0}^{h} e^{+j\theta} d\theta$ Here using this property, changing integration of the first term.

$$A_z = \frac{\mu I_m e^{-j\beta r}}{4\pi r} \left[\int_{0}^{h} \cos\beta z e^{j\beta z\cos\theta} dz + \int_{0}^{h} \cos\beta z e^{j\beta z\cos\theta} dz \right]$$

$$A_z = \frac{\mu I_m e^{-j\beta r}}{4\pi r} \int_{0}^{h} \cos\beta z \left(e^{j\beta z\cos\theta} + e^{-j\beta z\cos\theta} \right) dz$$

WKT $\frac{e^{j\theta} + e^{-j\theta}}{2} = \cos(\beta z\cos\theta)$

$$A_z = \frac{\mu I_m e^{-j\beta r}}{4\pi r} \int \cos\beta z \cos(\beta z\cos\theta) dz$$

$|E_\phi|$ [illegible] $= \frac{60 I_m}{r} \left\{ \frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right\}$

$|E_\phi| = \frac{60 I_m}{r} \left\{ \frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right\}$ V/m

Power radiated by a half wave dipole and it radiates [illegible]

$P_{max} = |E_\phi||H_\phi| = \frac{60 I_m}{r} \left\{ \frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right\} \left\{ \frac{I_m}{2\pi r} \left[\frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right] \right\}$

$P_{max} = \frac{30 I_m^2}{\pi r^2} \left\{ \frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right\}^2$

$P_{avg} = \frac{E_\phi}{\sqrt{2}} \frac{H_\phi}{\sqrt{2}} = \frac{1}{2} E_\phi H_\phi = \frac{P_{max}}{2}$

$P_{max} = \frac{15 I_m^2}{\pi r^2} \left[\frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right]^2$ W/m²

$I_{rms} = \frac{I_m}{\sqrt{2}} = I_m \sqrt{2} I_{rms}$

$\frac{15 (\sqrt{2} I_{rms})^2}{\pi r^2} \left\{ \frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \right\}^2$

Power radiated $= 60 I_{rms}^2 \times 1.219$

$P_r = 73.140 I_{rms}^2$

Radiation resistance $\omega_r = R_r I_{rms}^2$

$\boxed{R_r = 73.14 = 73\Omega}$

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DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : G /Slot:7		**Course Handling Faculty :** Dr. J. Josephine Pon Gloria		
1.	VTU19647	KONREDDYGARI MANJUNATHA REDDY	C	5.5
2.	VTU19884	SURAPUREDDY VENKATA SURENDRA REDDY	C	0
3.	VTU20669	BELLAMKONDA SUDHARSHAN	C	0
4.	VTU20844	DASARI SHANMUK SHANDAN	C	0
5.	VTU20926	KANIYAMPATI VEERA HEMANTH KUMAR	C	0
6.	VTU21024	M HRUSHIKESH BHARADWAJ	C	6.5
7.	VTU21084	GOVINDU VIJAY SAI	C	11.5
8.	VTU21090	KAKUMANI SRINU	C	0
9.	VTU21118	BHOOMIREDDY VISHNU TEJA REDDY	C	0
10.	VTU21120	ANNEPU LAKSHMI ADHITYA	C	0
11.	VTU21212	CHAKALI ANIL KUMAR	C	0

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:
1. Irregular to the class
2. Difficulty in solving problems and derivation
3. Lack of attention and focus in class

Action Planned:
- Planned to conduct Special classes.
- Planned to conduct slip test.
- Planned to give more practice on tutorial problems and derivations

Faculty Signature **Course Coordinator** **HOD/ECE**

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DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : G /Slot:7		**Course Handling Faculty :** Dr. J. Josephine Pon Gloria			
1.	VTU19647	KONREDDYGARI MANJUNATHA REDDY	9	8	D
2.	VTU19884	SURAPUREDDY VENKATA SURENDRA REDDY	0	20	D
3.	VTU20669	BELLAMKONDA SUDHARSHAN	0	0	RA
4.	VTU20844	DASARI SHANMUK SHANDAN	0	0	RA
5.	VTU20926	KANIYAMPATI VEERA HEMANTH KUMAR	0	0	NE
6.	VTU21024	M HRUSHIKESH BHARADWAJ	0	6	RA
7.	VTU21084	GOVINDU VIJAY SAI	0	10.5	D
8.	VTU21090	KAKUMANI SRINU	0	4	RA
9.	VTU21118	BHOOMIREDDY VISHNU TEJA REDDY	0	0	NE
10.	VTU21120	ANNEPU LAKSHMI ADHITYA	2	0	RA
11.	VTU21212	CHAKALI ANIL KUMAR	3.5	9	RA

Action Taken:

1. Slip tests were conducted.
2. Text books and materials were shared
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were discussed.

Improvements Observed:

1. The Performance of few students were improved in T2 and T3 compared to T1
2. Students were able to present appropriate answers within the stipulated time.

Faculty Signature **Course Coordinator** HOD/ECE

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DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title : Antenna Theory

Course Handling Faculty: Dr.J.Josephine Pon Gloria

Course Coordinator : Dr. M.Anto Bennet

Course Code:1021IEC113

Academic Year: 2023-2024

Semester : Summer

Date	Time
05.09.2023	4.45 PM – 5.35 PM
12.09.2023	4.45 PM – 5.35 PM
19.09.2023	4.45 PM – 5.35 PM
03.10.2023	4.45 PM – 5.35 PM
10.10.2023	4.45 PM – 5.35 PM
17.10.2023	4.45 PM – 5.35 PM

Faculty

Course Coordinator

HOD ECE

CLASS: G/SM

Summer

SEM.: V 23-24 COURSE: 1021 EC113 Antenna Theory

	Roll No.	Name	Month / Date / Hour	5/9	7/9	9/9	3/10	10/10	11/10	
		SLOW LEARNERS	Hour	8	8	8	8	8	8	
1	VTU19647	KONREDDYGARI MANJUNATHA REDDY		1	2	3	4	5	6	1
2	19884	SURAPUREDDY VENKATA SURENDRA REDDY		1	2	A	3	A	4	2
3	20669	BELLAMKONDA SUDHARSHAN		A	A	A	A	A	A	3
4	20844	DASARI SHANMUK SHANDAN		A	1	2	A	3	4	4
5	20926	KANIYAMPATI VEERA HEMANTH KUMAR		A	A	A	A	A	A	5
6	21024	M HRUSHIKESH BHARADWAJ		A	1	2	3	4	A	6
7	21084	GOVINDU VIJAY SAI		1	A	2	A	3	4	7
8	21090	KAKUMANU SRINU		1	2	A	A	3	4	8
9	21118	BHOOMIREDDY VISHNU TEJA REDDY		A	A	A	A	A	A	9
10	21120	ANNEPU LAKSHMI ADHITYA		A	A	A	A	1	2	10
11	21212	CHAKALI ANIL KUMAR.		1	A	2	A	3	4	11
12										12
13										13
14										14
15										15
16										16
17										17
18										18
19										19
20										20
21										21
22										22
23										23
24										24
25										25
26										26
27										27
		No. of Absentees		6	6	6	8	4	4	
		Initials								

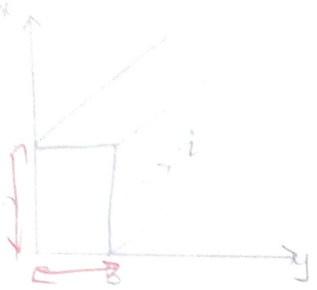
		SLOW LEARNERS				
1	5/9/23	Infinitesimal dipole	1			
2	12/9/23	Half wave dipole	1			
3	19/9/23	Broadside & End fire	1			
4	3/10/23	Horn antenna	1			
5	10/10/23	Structure of atmosphere	1			
6	17/10/23	Helical Antenna	1			

B. Sudharshan
vtu20669

Antenna Theory
slip test

Obtain the solution of electric and magnetic fields of TE waves guided along rectangular wave guide

TE Transverse electric wave in rectangular wave guide



Boundary cond^n

i) $x = 0, x = a$

ii) $y = 0, y = b$

TE condition

$E_z = 0$ and $H_z \neq 0$

Maxwell eqn:

$$E_x = \frac{-\gamma}{h^2}\left(\frac{\partial E_z}{\partial x}\right) - j\frac{\omega\mu}{h^2}\left(\frac{\partial H_z}{\partial y}\right) \qquad E_y = \frac{-\gamma}{h^2}\left(\frac{\partial E_z}{\partial y}\right) + j\frac{\omega\mu}{h^2}\left(\frac{\partial H_z}{\partial x}\right)$$

$$H_x = \frac{-\gamma}{h^2}\left(\frac{\partial H_z}{\partial x}\right) + j\frac{\omega\varepsilon}{h^2}\left(\frac{\partial E_z}{\partial y}\right) \qquad H_y = \frac{-\gamma}{h^2}\left(\frac{\partial H_z}{\partial y}\right) - j\frac{\omega\varepsilon}{h^2}\left(\frac{\partial E_z}{\partial x}\right)$$

i) To find H_z:

$H_z = XY$

$X = C_1\cos Ax + C_2\sin Ax$

$Y = C_3\cos By + C_4\sin By$

$H_z = (C_1\cos Ax + C_2\sin Ax)(C_3\cos By + C_4\sin By)\, e^{-\gamma z}$ — (1)

$\therefore E_y = \frac{j\omega\mu}{h^2}\left(\frac{\partial H_z}{\partial x}\right)$

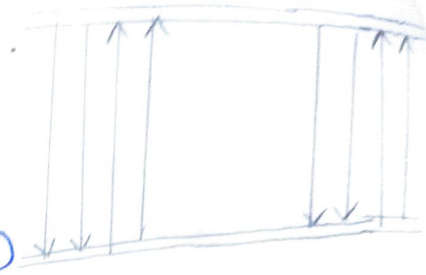
$E_y = \frac{j\omega\mu}{h^2}\frac{\partial}{\partial x}(C_1\cos Ax + C_2\sin Ax)(C_3\cos By + C_4\sin By)$

$E_y = \frac{j\omega\mu}{h^2}(-C_1 A\sin Ax + C_2 A\cos Ax)(C_3\cos By + C_4\sin By)$

1. $x=0$, $E_y=0$

$C_2=0$

$$E_y = \frac{j\omega\mu}{h^2}(-C_1 A \sin Ax)(C_3 \cos By + C_4 \sin y)e^{-\gamma z}$$



2. $x=a$, $\rightarrow E_y=0$

$$\boxed{A=\frac{m\pi}{a}}$$

$$\boxed{C_4=0} \qquad E_x = \frac{-j\omega\mu}{h^2} C_1 \cos Ax(-C_3 B \sin By)$$

$$B=\frac{n\pi}{b}$$

$$H_z = C_1 C_3 \cos Ax \cos By e^{-\gamma z}$$

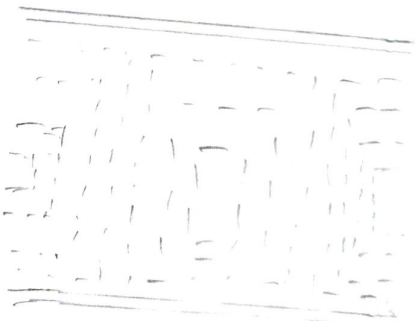
$$H_z = C\cos\left(\frac{m\pi x}{a}\right)\cos\left(\frac{n\pi}{b}y\right)e^{-\gamma z}$$

∴ The field eqns of TE waves are sub $A=\frac{m\pi}{a}$, $B=\frac{n\pi}{b}$, $\gamma=jk$

$$E_x = \frac{j\omega\mu}{h^2} C\cdot\left(\frac{n\pi}{b}\right)\cos\left(\frac{m\pi}{a}\right)x \sin\left(\frac{n\pi}{b}\right)y\, e^{-jkz}$$

$$E_y = \frac{-j\omega\mu}{h^2} C\left(\frac{m\pi}{a}\right)\sin\left(\frac{m\pi}{a}\right)x\cos\left(\frac{n\pi}{b}\right)y\, e^{-jkz}$$

$E_z=0$



$$H_x = \frac{jk}{h^2} C\left(\frac{m\pi}{a}\right)\sin\left(\frac{m\pi}{a}\right)x\cdot\cos\left(\frac{n\pi}{b}\right)y\, e^{-jkz}$$

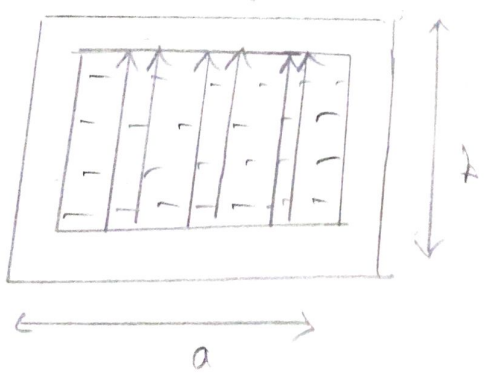
$$H_y = \frac{jk}{h^2} C\left(\frac{n\pi}{b}\right)\cos\left(\frac{m\pi}{a}\right)x\cdot\sin\left(\frac{n\pi}{b}\right)y e^{-jkz}$$

$$H_z = C\cos\left(\frac{m\pi}{a}\right)x\cdot\cos\left(\frac{n\pi}{b}\right)y\, e^{-jkz}$$

$$h^2 = A^2 + B^2$$

$$h^2 = \left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2$$

$$f_c = \frac{1}{2\sqrt{\mu\varepsilon}}\sqrt{\left(\frac{m}{a}\right)^2+\left(\frac{n}{b}\right)^2}$$



SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

Slow Learner Time Table

Dr.Bikash Ranjan Behera

Day / Hour	I 08:45 am 09:35 am	II 09:45 am 10:35am	III 10:45 am 11:35 am	IV 11:45 am 12:35 pm	12:35 pm 01:45 pm	V 01:45 pm 02:35 pm	VI 02:45 pm 03:35 pm	VII 03:45 pm 04:35 pm	VIII [illegible]
Mon					LUNCH				
Tue									
Wed								AT	
Thu							AT*		
Fri									AT*
Sat									

AT*: Slow Learner Hours

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A /Slot:1		**Course Handling Faculty :** Dr. M.Anto Bennet		
1.	VTU19103	KOUDI SRIKANTH REDDY	C	00
2.	VTU19767	ADDANKI JOHN SUJITH	C	13
3.	VTU19786	SAMUDRALA RAMCHARAN BABU	C	13
4.	VTU19899	GAJJALA PRANAY KUMAR REDDY	C	00
5.	VTU20126	VAKA KRISHNA KANTH	C	00
6.	VTU20624	YEDDULA AKHIL	C	10
7.	VTU20685	BANDI ANAND REDDY	C	00
8.	VTU20759	YADDANAPUDI VENKATA SRI HARSHA	C	00
9.	VTU21043	BETHINA BHANU KRISHNA MOULI	C	00
10.	VTU21218	TALLURI VENKATA SAI PRASAD	C	00

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Irregular to the class
2. Difficulty in solving problems and derivation
3. Lack of attention and focus in class

Action Planned:

- Planned to conduct Special classes.
- Planned to conduct slip test.
- Planned to give more practice on tutorial problems and derivations

Faculty Signature **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : A /Slot:1		**Course Handling Faculty :** Dr. Dr. M. Anto Bennet			
1.	VTU19103	KOUDI SRIKANTH REDDY	13	22	C
2.	VTU19767	ADDANKI JOHN SUJITH	13	20	RA
3.	VTU19786	SAMUDRALA RAMCHARAN BABU	00	18	D
4.	VTU19899	GAJJALA PRANAY KUMAR REDDY	00	23	D
5.	VTU20126	VAKA KRISHNA KANTH	00	23	D
6.	VTU20624	YEDDULA AKHIL	00	18	D
7.	VTU20685	BANDI ANAND REDDY	00	20	D
8.	VTU20759	YADDANAPUDI VENKATA SRI HARSHA	00	00	NE
9.	VTU21043	BETHINA BHANU KRISHNA MOULI	00	14	RA
10.	VTU21218	TALLURI VENKATA SAI PRASAD	20	25	C

Action Taken:

1. Slip tests were conducted.
2. Text books and materials were shared
3. Discussed about how to present each and every question in the CIA tests and university exam.
4. Important concepts were discussed.

Improvements Observed:

1. The Performance of few students were improved in T2 and T3 compared to T1
2. Students were able to present appropriate answers within the stipulated time.

Faculty Signature **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

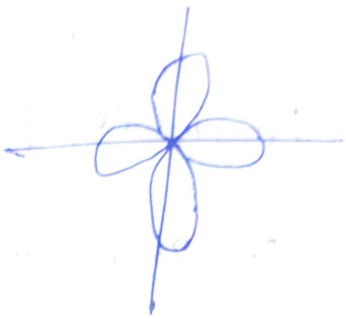
Course Title : Antenna Theory
Course Code:10211EC113
Course Handling Faculty: Dr.M.Anto Benner
Academic Year: 2023-2024
Course Coordinator : Dr. M.Anto Bennet
Semester : Summer

Date	Time
05.09.2023	4.45 PM – 5.35 PM
12.09.2023	4.45 PM – 5.35 PM
19.09.2023	4.45 PM – 5.35 PM
03.10.2023	4.45 PM – 5.35 PM
10.10.2023	4.45 PM – 5.35 PM
17.10.2023	4.45 PM – 5.35 PM

Faculty **Course Coordinator** **HOD ECE**

the elements an end with array and same amplitude and opposite current

$(\theta max) = 0°, 180°$.



$\psi = \beta d\cos\theta + \alpha$

$\psi = 0$

$\beta\cos + d = 0$

$\beta d\cos\theta = \alpha$

for $\theta = 0$ $\quad \beta d\cos\theta = -\alpha$

$\beta d = -\alpha$

maximum direction θ

$$\epsilon_n = \frac{\sin n\psi}{2}$$

$$\frac{n\psi}{2} = \sin^{-1}(1)$$

$$= \pm(2n+1)\pi/2$$

$$= \pm 2(n+1)\pi/2 + 2\pi$$

for $\beta = 2\pi/\lambda$ $d = \lambda/2$ $n=1$, $n=4$.

$$\cos\theta = \pm\frac{(2+1)\pi}{4\times 2\pi/2\lambda/2}$$

$$= 1 \pm (3/4$$

$$(\theta max)_{min} = \cos^{-1}(+3/4)$$

$$= \cos^{-1}(1/4)$$

$$= 75.5$$

$(\theta max) \ldots = |\cos^{-1}(3/4)| = 226.5°$

T. Aditya
VTU-20993

Broad Side array

FNBW & HPBW



$\theta_{min} = 90^\circ - \gamma$

$P_0 - \gamma = \cos^{-1}\left(\frac{\pm N\lambda}{nd}\right)$

$\cos 90 - 1 = \pm\left(\frac{N\lambda}{nd}\right)$

$\sin\gamma = \frac{\pm N\lambda}{nd}$

$\gamma = \pm\left(\frac{1}{L}\right)$

$\gamma = \pm \frac{57.3}{L\lambda}$

$FNBW = 2\gamma$

$FNBW = \pm \frac{114.6^\circ}{L\lambda}$

$HPBW = \frac{FNBW}{2} = \pm \frac{57.3^\circ}{L\lambda}$

directivity $= 2n\,(d/\lambda)$

$= 2(L/\lambda)$

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC202 /Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Mid Term Test I
Section : A		Course Handling Faculty : Dr.E.D. Kanmani Ruby		
1.	VTU19475	SIRIGIRI YASWANTH SAI	C	AB
2.	VTU20705	VENKAT DINESH KUMAR G	C	AB
3.	VTU20924	MULE MADHAVA REDDY	C	AB
4.	VTU21158	TAMMISETTY MAHESH BABU	C	8
5.	VTU21179	BETHAMCHARLA MANIKANTA	C	AB
6.	VTU21218	TALLURI VENKATA SAI PRASAD	C	AB

Reason for Low Performance:

- Attendance Percentage is Poor.
- Not presented the concepts clearly.

Action Planned:

- To conduct Special class on every Tuesday till University Exams.
- To inform the less attendance percentage and test marks to the respective mentors.

Faculty **Course Coordinator** **HOD Sign**

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Term Test II	End Semester Result
Section : D		**Course Handling Faculty : Dr.E.D. Kanmani Ruby**		
1	VTU19839	MUVVA NIKHIL SAI	10	C
2	VTU20729	CHALLA VENUMADHAV	11	B
3	VTU20739	VEGURU PREM CHAND	11	C
4	VTU21017	CHINTALA RAVI TEJA	5	AB
5	VTU21206	EPURI SAI KIRAN	13	B
6	VTU21267	S BHARGAVA	AB	NE

Action Taken:

1. Extra classes were conducted for slow learners.

Improvements Observed:

1. The Performance of student no 1, 2, 3 & 5 were little bit improved in MT2 compared to MT1.

2. 50% of slow learners have shown improvement

Faculty

Course Coordinator

HOD Sign

Slow learners Special class

CLASS: A SEC SEM: S5 2324 COURSE: Internet of Things

Sl No	Roll No	Name	Week							
			Date	25/8	31/8	1/9	8/9	15/9	22/9	29/9
			Hour	1	2	3	1	2	3	
1	19237	Muvva Nikhil Sai		1	2	a	a	3	a	a
2	20279	Challa Venumadhav		1	2	3	4	a	a	a
3	20739	Vegunta Prem Chand		1	2	3	4	5	a	a
4	21017	Chintala Ravi Teja		a	a	a	a	1	a	a
5	21201	Epuru Sai Kiran		1	2	3	4	5	a	a
6	21267	S. Bhargava		a	a	a	a	a	a	1
7										
8										
9										
10										
11										
12		Topics: Evolution of IOT								
13										
14	20/8/23	IOT Architecture								
15	30/8/23	Functional blocks of IOT Ecosystem								
16	1/9/23	Arduino IDE Basic Commands								
17	8/9/23	Interfacing program with Arduino								
18	13/9/23	Raspberry Pi - Basics								
19	15/9/23	Interfacing with Pi								
20	20/9/23	Data protocol								
21	22/9/23	Cloud & cloud computing								
22	29/9/23	Fog & fog computing								
23	4/10/23	Open Stack & Aws								
24	6/10/23	Smart applications								
25	11/10/23	Smart food, lighting								
26	13/10/23	Parking & Smart Traffic								
27	18/10/23									
		No. of Absentees		2	2	3	3	2	5	1
		Initials								

ASP ASP

CONTINUE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNERS CLASS TIMETABLE
VTR UGE 21
10211EC201 – INTERNET OF THINGS

Name of the Faculty: Dr. E D Kanmani Ruby
Section: Slot 1
Name of the Course Coordinator: Dr. Kanmani Ruby

TTS No: 2904
Semester: Summer (2023 – 2024)
Course: Programme Core

S. No	DATE	TIMINGS
1.	25.08.2023	04.45 pm – 05.45 pm
2.	30.08.2023	04.45 pm – 05.45 pm
3.	29.09.2023	04.45 pm – 05.45 pm
4.	01.09.2023	04.45 pm – 05.45 pm
5.	08.09.2023	10.45 am – 12.35 pm
6.	13.09.2023	10.45 am – 12.35 pm
7.	15.09.2023	10.45 am – 12.35 pm
8.	20.09.2023	10.45 am – 12.35 pm
9.	22.09.2023	10.45 am – 12.35 pm
10.	27.09.2023	10.45 am – 12.35 pm
11.	29.09.2023	04.45 pm – 05.45 pm
12.	04.10.2023	04.45 pm – 05.45 pm
13.	06.10.2023	04.45 pm – 05.45 pm
14.	11.10.2023	04.45 pm – 05.45 pm
15.	13.10.2023	04.45 pm – 05.45 pm
16.	18.10.2023	04.45 pm – 05.45 pm

Faculty In-Charge **Course Coordinator** **HOD / ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10211EC202 /Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Mid Term Test I
Section : B		Course Handling Faculty : Dr. G.Sasikala		
1.	20778	NAVEEN KUMAR	C	1
2.	20801	SHAIK AYAZ	C	AB
3.	20885	BANDARU ANAND JAGAN MOHAN RAO	C	3.5
4.	21061	KAVALI VISWANATHA NAIDU	C	7
5.	24104	KOSURU LALITH SAI	C	6

Reason for Low Performance:

- Even though studied confused with the fundamental concepts.

Action Planned:

- Planned to provide question bank for each unit.

Faculty

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Term Test II	End Semester Result
Section : B		Course Handling Faculty : Dr. G.Sasikala		
1	20778	NAVEEN KUMAR	5.5	C
2	20801	SHAIK AYAZ	8.5	C
3	20885	BANDARU ANAND JAGAN MOHAN RAO	AB	D
4	21061	KAVALI VISWANATHA NAIDU	AB	C
5	24104	KOSURU LALITH SAI	3.5	C

Action Taken:

1. Given question bank for each unit.

Improvements Observed:

1. ShaikAyaz and Naveen Kumar gradual improvements in MTII

Faculty

Course Coordinator

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC202 /Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Mid Term Test I
Section : D		**Course Handling Faculty :** Dr. B. Sathyasri		
1.	VTU19839	MUVVA NIKHIL SAI	C	AB
2.	VTU20729	CHALLA VENUMADHAV	C	8
3.	VTU20739	VEGURU PREM CHAND	C	7
4.	VTU21017	CHINTALA RAVI TEJA	C	1
5.	VTU21206	EPURI SAI KIRAN	C	2
6.	VTU21267	S BHARGAVA	C	AB

Reason for Low Performance:

- Attendance Percentage is Poor.
- Not presented the concepts clearly.

Action Planned:

- To conduct Special class on every Tuesday till University Exams.
- To inform the less attendance percentage and test marks to the respective mentors.

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners –Action Taken Report

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Term Test II	End Semester Result
Section : D		**Course Handling Faculty :** Dr. B. Sathyasri		
1	VTU19839	MUVVA NIKHIL SAI	10	C
2	VTU20729	CHALLA VENUMADHAV	11	B
3	VTU20739	VEGURU PREM CHAND	11	C
4	VTU21017	CHINTALA RAVI TEJA	5	RA
5	VTU21206	EPURI SAI KIRAN	13	B
6	VTU21267	S BHARGAVA	AB	NE

Action Taken:

1. Extra classes were conducted for slow learners.

Improvements Observed:

1. The Performance of student no 1, 2, 3 & 5 were little bit improved in MT2 compared to MT1.

Faculty **Course Coordinator** **HOD Sign**

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNERS CLASS TIMETABLE
VTR UGE 21

10211EC201 – INTERNET OF THINGS

Name of the Faculty: Dr. B.Sathyasri
Section: Slot 4
Name of the Course Coordinator: Dr. Kanmani Ruby

TTS No: 2953
Semester: Summer (2023 – 2024)
Course: Programme Core

S. No	DATE	TIMINGS
1.	08.08.2023	04.45 pm – 05.45 pm
2.	22.08.2023	04.45 pm – 05.45 pm
3.	29.08.2023	04.45 pm – 05.45 pm
4.	05.09.2023	04.45 pm – 05.45 pm
5.	12.09.2023	10.45 am – 12.35 pm
6.	19.09.2023	10.45 am – 12.35 pm
7.	26.09.2023	10.45 am – 12.35 pm
8.	03.10.2023	10.45 am – 12.35 pm
9.	10.10.2023	10.45 am – 12.35 pm
10.	17.10.2023	10.45 am – 12.35 pm

Faculty In-Charge **Course Coordinator** **HOD / ECE**

Special class

CLASS III ECE SEM V COURSE [illegible]

	Roll No	Name	Month	Aug / Sep						
			Date	8	22	29	5	12		
			Hour							
1	19839	Muvva Nikhil Sai		A	1	2	3	4	5	
2	20729	challa Venumadhav.		1	2	3	4	5		
3	20739	V Premchand		1	2	3	4	5	6	
4	21017	C. Ravi Teja.		1	2	3	4	5	A	
5	21206	E Sai Kiran		1	2	3	4	5	6	
6	21267	S. Bhargava.		1	2	3	4	5	6	
7				A	A	A	A	A	A	A
8										
9										
10										
11										
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16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
	No. of Absentees			2	1	1	1	1	2	2

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC202 /Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Mid Term Test I
Section : E		**Course Handling Faculty :**Dr. S. Oudaya coumar		
1.	VTU19064	G PUNAR VIKAS	C	8
2.	VTU19404	NALLALA SAI ARUN KUMAR	C	AB
3.	VTU19291	MUPPALLA YASWANTH CHOWDARY	C	7
4.	VTU19659	NAGISETTI YASWANTH	C	7
5.	VTU20669	BELLAMKONDA SUDHARSHAN	C	3
6.	VTU20685	BANDI ANAND REDDY	C	6

Reason for Low Performance:

- Attendance Percentage is Poor.
- Not presented the concepts clearly.

Action Planned:

- To conduct Special class on every Tuesday till University Exams.
- To inform the less attendance percentage and test marks to the respective mentors.

Faculty **Course Coordinator** **HOD Sign**

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Term Test II	End Semester Result
Section : E		**Course Handling Faculty :** Dr. S. Oudaya coumar		
1	VTU19064	G PUNAR VIKAS	10	C
2	VTU19404	NALLALA SAI ARUN KUMAR	11	B
3	VTU19291	MUPPALLA YASWANTH CHOWDARY	11	C
4	VTU19659	NAGISETTI YASWANTH	10	B
5	VTU20669	BELLAMKONDA SUDHARSHAN	13	C
6	VTU20685	BANDI ANAND REDDY	12	D

Action Taken:

1. Extra classes were conducted for slow learners.

Improvements Observed:

1. The Performance of student no 1, 2, 3 & 5 were little bit improved in MT2 compared to MT1.

Faculty

Course Coordinator

HOD Sign

TOPIC:

I IoT world forum
II IoT Sensor & Actuators
III Arduino board Architecture
IV Raspberry Pi Architecture
V MQTT Architecture
VI COAP protocol Architecture
VII Cloud Architecture
VIII Fog Deployment models
IX Smart Grid Architecture
X Smart parking & lighting

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNERS CLASS TIMETABLE
VTR UGE 21
10211EC201 – INTERNET OF THINGS

Name of the Faculty: Dr. S Oudayacoumar TTS No:
Section: Slot Semester: Summer (2023 – 2024)
Name of the Course Coordinator: Dr. Kanmani Ruby Course: Programme Core

S. No	DATE	TIMINGS
1.	25.08.2023	04.45 pm – 05.45 pm
2.	30.08.2023	04.45 pm – 05.45 pm
3.	29.09.2023	04.45 pm – 05.45 pm
4.	01.09.2023	04.45 pm – 05.45 pm
5.	08.09.2023	10.45 am – 12.35 pm
6.	13.09.2023	10.45 am – 12.35 pm
7.	15.09.2023	10.45 am – 12.35 pm
8.	20.09.2023	10.45 am – 12.35 pm
9.	22.09.2023	10.45 am – 12.35 pm
10.	27.09.2023	10.45 am – 12.35 pm
11.	29.09.2023	04.45 pm – 05.45 pm
12.	04.10.2023	04.45 pm – 05.45 pm
13.	06.10.2023	04.45 pm – 05.45 pm
14.	11.10.2023	04.45 pm – 05.45 pm
15.	13.10.2023	04.45 pm – 05.45 pm
16.	18.10.2023	04.45 pm – 05.45 pm

Faculty In-Charge **Course Coordinator** **HOD / ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title: 10211EC202-Internet of Things

Course Coordinator: Dr. Kanmani Ruby

S. No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section: J		**Course Handling Faculty:** Dr. M. Sathesh		
1.	VTU19418	SAKTHIKUMAR S	C	3
2.	VTU19603	Y BHARATH KUMAR REDDY	C	AB
3.	VTU19737	GUNJI VAMSI	C	AB
4.	VTU20302	VENKATA BHANU CHANDRADEEP	C	1
5.	VTU20409	MUKKERA GOPI CHAND REDDY	C	2
6.	VTU20502	ASWIN S	C	2
7.	VTU20707	AKUNURI BAJI BABU	C	AB
8.	VTU20896	KODURI AJAY KUMAR	C	AB
9.	VTU20965	SHAIK K KAIF	C	AB
10.	VTU21158	TAMMISETTY MAHESH BABU	C	AB
11.	VTU21195	BEZAWADA PURNA PHANI SAI	C	3.5
12.	VTU21201	KOTTE LOKESH	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

- Attendance Percentage is Poor
- Not Presented the concepts and Problems properly

Action Planned:

- To conduct Special class till University Exams
- To inform the less Attendance percentage and test marks to the respective mentors
- To handle Previous Year University Papers about how to present the answers in exam.
- To conduct slip test from the Question Bank

Dr. M. Sathesh.

Faculty | Course Coordinator | HOD Sign

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title: 10211EC202-Internet of Things

Course Coordinator: Dr. Kanmani Ruby

S. No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test I	TEST II	End Semester Result
Section: J		**Course Handling Faculty:** Dr. M. Sathesh			
1.	VTU19418	SAKTHIKUMAR S	3	AB	D
2.	VTU19603	Y BHARATH KUMAR REDDY	AB	0	D
3.	VTU19737	GUNJI VAMSI	AB	AB	C
4.	VTU20302	V BHANU CHANDRADEEP	1	15.5	B
5.	VTU20409	MUKKERA GOPI CHAND REDDY	2	AB	C
6.	VTU20502	ASWIN S	2	AB	D
7.	VTU20707	AKUNURI BAJI BABU	AB	10	C
8.	VTU20896	KODURI AJAY KUMAR	AB	AB	D
9.	VTU20965	SHAIK K KAIF	AB	17	A
10.	VTU21158	TAMMISETTY MAHESH BABU	AB	13.5	C
11.	VTU21195	BEZAWADA PURNA PHANI SAI	3.5	17.5	C
12.	VTU21201	KOTTE LOKESH	AB	AB	B

Action Taken:
Conducted special class and slip test.
Instructed the students to present the answers in a legible way.

Improvements Observed:
1. The Performance of student no 4,7,9,10 & 11 were improved in MT2 compared to MT1.

Dr. M. Sathesh.

Faculty **Course Coordinator** **HOD Sign**

Slow learners.

CLASS: Sec -J SEM.: SS2324 COURSE: Internet of Things

	Roll No. VTU	Name	Month	8	8	9	9	9	9	9	9	Seminar										
			Date	25	30	1	8	13	15	20	22	9	9	10	10	10	10	10				M
			Hour	8	8	8	8	8	8	8	8	27	29	4	6	11	13	18				D
																						H
1	19418	SAKTHIKUMAR . S		A	A	1	A	2	3	4	A	8	8	8	8	8	8	8				
2	19603	Y. BHARATH KUMAR REDDY		1	2	A	3	4	A	5	6	A	5	6	A	7	A	8		3	A	1 No Imp
3	19737	G. VAMSI		A	A	A	1	2	3	A	A	7	8	9	A	10	11	12		A	0	2 No Imp
4	20302	N.V. BHANU CHANDRADEEP		1	2	3	4	5	6	A	7	4	5	6	A	7	8	9		A	A	3 AB
5	20409	MUKKERA GOPI CHAND REDDY		1	2	3	4	5	6	7	8	8	A	9	10	11	12	13		1	5.5	4
6	20502	ASWIN . S		A	1	2	A	3	4	5	A	9	10	11	12	13	14	A		2	A	5 No Imp
7	20707	AKUNURI BAJI BABU		A	1	A	A	A	A	A	2	A	6	7	A	8	A	9		2	A	6 No Imp
8	20896	KODURI AJAY KUMAR		1	A	A	2	3	A	A	A	3	A	A	A	A	4	5		A	10	7
9	20965	SHAIK K KAIF		A	1	2	3	4	5	6	7	4	A	5	A	6	7	8		A	A	8 AB
10	21158	TAMMISETTY MAHESH BABU		1	2	A	3	4	A	A	5	8	A	9	10	11	A	12		A	17	9
11	21195	PURNA PANI SAI		1	2	3	4	5	6	A	7	A	6	7	8	9	A	10		A	13.5	10
12	21201	KOTTE LOKESH		1	2	3	4	5	6	7	A	8	9	10	11	12	A	13		3.5	A.5	11
13												8	9	10	11	12	13	14		A	A	12 AB
14	20/8/23	Topics: Evolution of IoT.																				13
15	30/8/23	IoT Architecture.																				14
16	1/9/23	Functional Block of IoT Eco System.																				15
17	8/9/23	Arduino IDE Basic Commands																				16
18	13/9/23	Interfacing Program with Arduino																				17
19	15/9/23	Raspberry Pi Basic & Terminal Commands																				18
20	20/9/23	Interfacing Pgm with Pi.																				19
21	22/9/23	Data Protocol																				20
22	27/9/23	cloud & cloud Computing																				21
23	29/9/23	Fog & Fog Computing																				22
24	4/10/23	Open Stack & AWS																				23
25	6/10/23	Smart Grid																				24
26	11/10/23	Smart Lighting																				25
27	13/10/23	Smart Parking																				26
	18/10/23	Smart Traffic																				27
	No. of Absentees		P	7	9	7	9	11	8	6	7	9	8	11	6	12	7	11				
			(A)	5	3	5	3	1	4	6	5	3	4	1	6	0	5	1				
	Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

18/10/24

Purna phani sai
(vtu02195)

1) IoT architecture:

* A four-step process through which data flows from devices connected to sensors
* To sensors through a network, and then through the cloud for processing analysis

2) Functional blocks of IoT ecosystem

Functional blocks of IoT devices are sensors, processors, connectivity modules, power supply, memory and storage, security Actuators

3) Data protocol in IoT

IoT devices communicate using IoT protocols. Internet protocol is a set of rules that dictates how data gets sent to the internet

4) Smart Grid

Smart Grid involve IoT devices that can communicate with each other and with the consumers

5) smart parking in IoT

This system is a centralised management system that allows drivers to use a smartphone app to search for and reserve a parking spot

6) Smart traffic

A smart traffic management system using iot enables the monitoring of traffic in all the streets in a city through a centralised control centre

7) Open stack in IoT

Open stack is a collection of open-source software for building cloud computing platforms that includes support for both public and private cloud environments

8) Fog Computing

Fog Computing is a Computing architecture in which a series of nodes receives data from IoT devices in real time

18/10/2024

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
B. TECH – ECE
SLOW LEARNERS CLASS TIMETABLE
VTR UGE 21
10211EC201 – INTERNET OF THINGS

Name of the Faculty: Dr. M. Sathesh
Section: Slot
Name of the Course Coordinator: Dr. Kanmani Ruby

TTS No:
Semester: Summer (2023 – 2024)
Course: Programme Core

S. No	DATE	TIMINGS
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12.	04.10.2023	04.45 pm – 05.45 pm
13.	06.10.2023	04.45 pm – 05.45 pm
14.	11.10.2023	04.45 pm – 05.45 pm
15.	13.10.2023	04.45 pm – 05.45 pm
16.	18.10.2023	04.45 pm – 05.45 pm

Faculty In-Charge

Course Coordinator

HOD / ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10211EC202 /Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Mid Term Test I
Section : H		**Course Handling Faculty :**Dr. Ashwini A		
1.	VTU21083	NAKKA SATHISH	C	6
2.	VTU21095	SUDANI LOKESH	C	5
3.	VTU21298	JONNAVADA ABHIRAM	C	2
4.	VTU23941	RAJESH S	C	7
5.	VTU19483	ALLADA HEMANTH	C	AB
6.	VTU21059	JYOTHI JASWANTH KUMAR	C	AB
7.	VTU21212	CHAKALI ANIL KUMAR	C	AB

Reason for Low Performance:

- Attendance Percentage is Poor.
- Not presented the concepts clearly.

Action Planned:

- To conduct Special class on every week till University Exams.
- To inform the less attendance percentage and test marks to the respective mentors.

Faculty **Course Coordinator** **HOD Sign**

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VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : H		Course Handling Faculty : Dr. Ashwini A		
1	VTU21210	RAJAN RISHAV	8.9	17

Training / Activities Conducted for fast learners

Attended workshop and value added course related to Iot

Improvement/ Achievement of fast learners

Gained an in-depth knowledge about various applications related to Iot

A. Ashwini 1/12/23
Faculty Signature

CC Signature

Ashwini
HOD Signature

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CORTINA™

Inphi
Think fast.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that Rajan Rishav [VTU21210],

III year ECE student of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology has successfully completed the ***30 hours Value Added Course*** *on* ***"Exploration of Raspberry Pi for Embedded Applications"*** *organized by the* ***Department of Electronics and Communication Engineering*** *in association with* ***Inphi Corporation, Chennai*** *on 11.08.2023, 12.08.2023, 25.06.2023 & 26.08.2023 .*

Mr. Rajadurai Samuel
Senior Verification Engineer

Dr. Mich Priyadharson

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Term Test II	End Semester Result
Section : H		Course Handling Faculty : Dr. Ashwini A		
1	VTU19483	ALLADA HEMANTH	AB	AB
2	VTU23941	RAJESH S	8	B

Action Taken:

1. Extra classes were conducted for slow learners.

Improvements Observed:

1. The performance of the students were improved in MT2 compared to MT1.

A. Ashwini 4/12/23
Faculty

Course Coordinator

HOD Sign

SEM COURSE

| | | |

12)

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC213/Digital Image and Video Processing

Course Coordinator : Dr. C.Raja

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section :		**Course Handling Faculty : Dr. J.Nirmal Jothi**		
1	VTU19743	KUDUMULA ROHITH	C	0
2	VTU19767	ADDANKI JOHN SUJITH	C	2
3	VTU20536	NARALA PRANAY KUMAR	C	6
4	VTU20817	UMMINENI KARTHEEK	C	2
5	VTU20895	VANGUR VINAY KUMAR	C	3
6	VTU20896	KODURI AJAY KUMAR	C	3
7	VTU20897	CHALLA VINAY	C	0
8	VTU23941	RAJESH S	C	4

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Lack of attendance
2. Lack of preparation for the test.

Action Planned:

1. To conduct special class and Slip Test

Faculty **Course Coordinator** **HOD**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR-UG-F-2021

Slow Learners Remedial Class Time Table

Course Title : Digital Image and Video Processing

Course Code:10212EC213

Course Handling Faculty: Dr.J.Nirmal Jothi

Academic Year: 2023-2024

Course Coordinator : Dr. C.Raja

Semester : Summer

Day/Hour	8.45-9.45 AM	9.45-10.45 AM	10.45-11.45 AM	11.45-12.45 PM	LUNCH	1.45-2.45 PM	2.45-3.45 PM	3.45-4.45 PM	4.45-5.45 PM
Monday			SL-DIVP						
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									

SL-DIVP – Slow Learner's Class for Digital Image and Video Processing

Faculty **Course Coordinator** **HOD ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10212EC213/Digital Image and Video Processing

Course Coordinator : Dr. C.Raja

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Model Lab	End Semester Result
Section : A		Course Handling Faculty : Dr. J.Nirmal Jothi			
1	VTU19743	KUDUMULA ROHITH	15.5	15	C
2	VTU19767	ADDANKI JOHN SUJITH	11.5	16	D
3	VTU20536	NARALA PRANAY KUMAR	10	16	D
4	VTU20817	UMMINENI KARTHEEK	0	19	D
5	VTU20895	VANGUR VINAY KUMAR	11	17	D
6	VTU20896	KODURI AJAY KUMAR	0	14	D
7	VTU20897	CHALLA VINAY	0	0	NE
8	VTU23941	RAJESH S	10	14	D

Action Taken:

- Special class and Slip Test conducted

Improvements Observed:

- Performance improved for 5 students in test 2.
- Performance improved for 7 students in Model Lab.

Faculty **Course Coordinator** **HOD**

SS.B [illegible] SEM [illegible] COURSE [illegible]

Month	August	September			October	
Date	29	12	19	26	3	17
Hour	3	3	3	3	3	3
[illegible] KUDUMULA ROHITH	/	/	AB	/	AB	/
[illegible] ADDANKI JOHN SUJITH	AB	/	AB	/	AB	/
[illegible] NARALA ARANAY KUMAR	AB	/	AB	/	/	/
[illegible] UMMINENI KARTHEEK	AB	/	AB	/	/	/
[illegible] VENGUR VINAY KUMAR	AB	AB	AB	/	/	/
[illegible] KODURI AJAY KUMAR	AB	/	AB	AB	/	AB
[illegible] CHALLA VINAY	AB	AB	AB	AB	AB	AB
[illegible] RAJESH . S	/	/	/	AB	/	/

Discrete Fourier transform:-

The 2D-DFT rectangular image $f(m,n)$. It is $M \times N$ transform

$f(m,n) \xrightarrow{\text{2D DFT}} f(k,l)$.

VTU 20536

Where $f(m,n)$:-

$$f(m,n) = \sum_{m=0}^{M-1} \sum_{n=0}^{N-1} f(m,n) e^{-j\frac{2\pi}{M}mk} e^{-j\frac{2\pi}{N}nl}$$

$$f(m,n) = \sum_{m=0}^{M-1} \sum_{n=0}^{N-1} f(m,n) e^{-j\frac{2\pi}{M}mk} e^{j\frac{2\pi}{N}ml}$$

If the square image of $N \times N$ transform

$$f(m,N) = \sum_{k=0}^{N-1} \sum_{N=0}^{N-1} f(m,n) e^{-j\frac{2\pi}{N}mk} e^{-j\frac{2\pi}{N}nl}.$$

the inverse image of $N \times N$ transform

$$f(m,N) = \frac{1}{N^2} \sum_{k=0}^{N-1} \sum_{N=0}^{N-1} f(m,n) e^{-j\frac{2\pi}{N}mk} e^{\frac{2\pi}{N}nl},$$

2D discrete fourier transform.

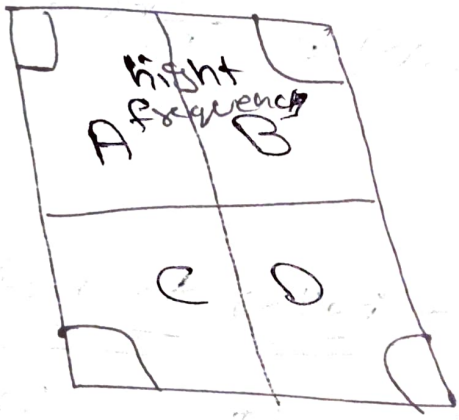
$$f(m,n) = R(k,l) + I(k,l)$$

proof:-

$$f(m,n) = \sum_{m=0}^{M=1} \sum_{N=0}^{N=1} f(m,n)\, e^{-j\frac{2\pi}{m}m}\, n) =$$

$$f(m,n) = \frac{1}{N^2}\left[\sum_{N=0}^{N=1} f(k,l)\, e^{-j\frac{2\pi}{m}mk}\right]$$

$$f(m,n) = R(k,l),\ I(k,l).$$





Spectic inverse Property.

the 2D DFT spectic inverse property

$f(m,n)\ f(m-m_0, n)$

$\cancel{f(m,n) = \sum_{m=0}^{N=1}}\ \Sigma$

$$f(m-m_0, n) = \sum_{M=0}^{M=1} \sum_{N=0}^{N=1} f(m-m_0, n)\, e^{-j\frac{2\pi}{m}mk}$$

$$e^{-j\frac{2\pi}{n}nl}.$$

13)

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTU R21 B.TECH – ECE

SUMMER 2023-24

List of Slow Learners – Action Planned Report

Course Code / Title : 1152EC259 / Fundamentals of Machine Learning

Course Coordinator :Dr.T Kanimozhi

S.No	VTU No.	Name of the Student	Category	Performance of the student in CIA
				Midterm I
Section : A		**Course Handling Faculty :Dr B.Venkataramanaiah**		
1	VTU21004	GUJJARLAPUDI JASWANTH NAGATEJA	C	AB
2	VTU21276	MUDEDLA SYAM DEEPAK	C	5
3	VTU24075	SARAGADAM GNANESWAR	C	AB

Criteria: Category C and absent/failed in MT1

Reason for Low Performance:

1. Difficulty in answering questions.
2. Absenteeism were found among students during exam

Action Planned:

1. Simple study material to be given
2. Additional written practice through slip test

Faculty **Course Coordinator** **HOD**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE 21 B.TECH – ECE

SUMMER 2023-24

List of Slow Learners – Action Taken Report

Course Title : Fundamentals of machine learning

Course Code : 10211EC214

Semester : Summer

Course Coordinator : Dr.T Kanimozhi

Course handling faculty: Dr B.Venkataramanaiah

Date after MT2 : 28.10.2023

Section: A

Academic Year :2023-2024

S.No	VTU No.	Name of the Student	Performance of the Student in CIA	
			MT2	End Semester Result
1.	VTU21004	GUJJARLAPUDI JASWANTH NAGATEJA	AB	AB
2.	VTU21276	MUDEDLA SYAM DEEPAK	17	D
3.	VTU24075	SARAGADAM GNANESWAR	10	P

Action Taken:

1. MCQ Conducted for better Training
2. Showed more videos related to Machine learning
3. Extra classes were conducted for slow learners.

Improvement Observed:

1. The Performance of student were improved in MT2

M Syam Deepak
VTU21276

Continuous distribution:-

The most widely used distribution in statistics and machine learning is the Gaussian or normal distribution.

its pdf is given by

$$N(x|\mu,a^2) \triangleq \frac{1}{\sqrt{2\pi a^2}} e^{-\frac{1}{2a^2}(x-\mu)^2}$$

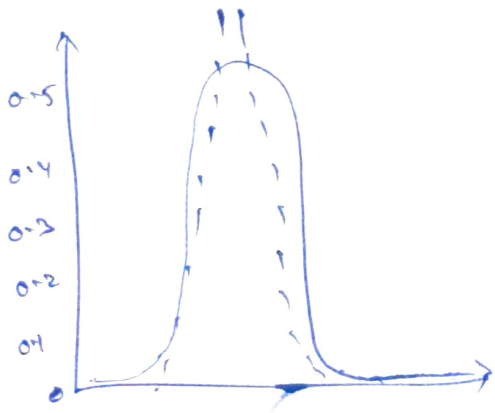
Here $\mu = E(x)$ is the mean (and mode)

A high precision means a narrow distribution.

the cdf in terms of the error function

$$\Phi(x;\mu,a^2) \triangleq \int_{-\infty}^{x} N(z|\mu,a^2)\,dz$$

Disadvantage of Gaussian distribution:-



$$\eta\, x|\mu,a^2,v) \propto \left(1+\frac{1}{v}\left(\frac{x-\mu}{a}\right)^2\right)^{-\left(\frac{v+1}{2}\right)}$$

Mean $= \mu$, mode $= \mu$, var $= \frac{va^2}{(v-2)}$

The variance is only defined if $v > 2$. The mean is only defined.

Laplace distribution:

It is know as double sided exponential

$$\text{Lap}(x|\mu, b) \triangleq \frac{1}{2b} \exp\left(-\frac{|x-\mu|}{b}\right)$$

This distribution has the following properties.

mean $= \mu$, mode $= \mu$, var $= 2$

It has more probability density at 0 than the Gaussian.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10212EC101/RF and Microwave Integrated Circuits

Course Coordinator : Dr.Beulah Jackson

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr.T.Kavitha		
1.	VTU19160	LOKESH B	C	9
2.	VTU19316	KOTHAPALLI CHANDRA NITHIN	C	3.5
3.	VTU19786	SAMUDRALA RAMCHARAN BABU	C	9
4.	VTU20693	KESULAPPAGARI JAYANTH NAIDU	C	13.5
5.	VTU20992	GORLA UMESH CHANDRA	C	7
6.	VTU21003	S VENKATA SURYA PRAKASH ROYAL	C	13.5

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

- Attendance Percentage is Poor
- Lack of preparation
- Difficult to understand the concepts

Action Planned:

- To conduct Special class till University Exams
- To inform the less Attendance percentage and test marks to the respective mentors
- To conduct slip test from the Question Bank

Faculty **Course Coordinator** **HOD Sign**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10212EC101/RF and Microwave Integrated Circuits

Course Coordinator : Dr.Beulah Jackson

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End Semester Result
Section : A		**Course Handling Faculty :** Dr.T.Kavitha			
1.	VTU19160	LOKESH B	1	3	RA
2.	VTU19316	KOTHAPALLI CHANDRA NITHIN	AB	AB	RA
3.	VTU19786	SAMUDRALA RAMCHARAN BABU	7.5	18	C
4.	VTU20693	KESULAPPAGARI JAYANTH NAIDU	5.5	AB	D
5.	VTU20992	GORLA UMESH CHANDRA	AB	AB	AB
6.	VTU21003	S VENKATA SURYA PRAKASH ROYAL	3	AB	RA

Action Taken:
Conducted special class and slip test.
Instructed the students to present the answers in a legible way.

Improvements Observed:

One student got improved

Faculty **Course Coordinator** **HOD Sign**

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(Deemed to be University Estd. u/s 3 of UGC Act 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

Special Time Table

Course Code and Title : 10212EC101 / RF and Microwave Integrated Circuits

Section : A

Course Coordinator : Dr. Beulah Jackson

S. No	Date	Timing
1	18/07/2023	4.45 pm – 5.35 pm
2	22/07/2023	4.45 pm – 5.35 pm
3	26/08/2023	4.45 pm – 5.35 pm
4	30/08/2023	4.45 pm – 5.35 pm
5	19/09/2023	4.45 pm – 5.35 pm
6	26/09/2023	4.45 pm – 5.35 pm
7	11/10/2023	4.45 pm – 5.35 pm
8	17/10/2023	4.45 pm – 5.35 pm

Course Coordinator

HOD/ECE

Slow learners Special class

CLASS: B.Tech SEM.: SUMMER COURSE: RF & MIC

	Name	Month	July/ Aug/ Sep/ Oct							
		Date	18	22	26	30	19	26	11	
		Hour	8	8	8	8	8	8	8	8
			1	2	3	4	5	6	7	8
19160	Lokesh B		1	2	3	4	5	6	7	8
19316	kothapalli chandra nithin		1	2	3	4	5	6	7	8
19786	Samudrala Ramcharan Babu		1	2	3	4	5	6	7	8
20693	Kesulappagari Jayanth Naidu		1	2	3	4	5	6	7	8
20992	Goola Umesh chandra		1	2	3	4	5	6	7	8
21003	S Venkata Surya prakash Royal		1	2	3	4	5	6	7	8

Topics Covered:

18/07/23	RF behavior of passive Capacitors
22/07/23	Reflection coefficient, standing waves
26/08/23	Microstrip line, Co-planar waveguide
30/08/23	fin line, MMIC technology
19/09/23	Hybrid MIC & Monolithic MIC
26/09/23	fabrication technology, Thermal
4/10/23	Micro machined Antenna, satelli
11/10/23	-te Transponder, Avionic systems

No. of present: 06 06 06 06 06 06 06 06

No. of Absentees AB: 00 00 00 00 00 00 00 00

RF and Microwave Integrated circuits

Unit - 3 Microwave Integrated circuits

Umesh chandra

vtu 20992

1. Multichip Module Technology

MCM is specialized electronic package where multiple Ic's semiconductor dies are packed on to a Unified substrate

* They have been introduced as an alternative packing approach to complement the advances which were taking place in ic technology
* packaging of the chips has become a more significant factor in performance.
* chip Interconnections play a more dominant & limited role in determing overall system speed or performance.

Physical Design Automation:

Physical design is similar as Ic's but design tools were distinct and cannot be directly used for MCM.

In designing the CAD tools for MCM
were taken in to consideration

* clock skew rate
* power noise disturbance
* Assembly effects

MCM-types

Mcm type

non programmable MCM

programmable MCM

MCM-C

MCM-L

MCM-D

low cost
high density

high cost
Very high density
Very high perfor...

Non-programmable MCM's

* MCM-L (Laminated MCM)
* MCM-C (Ceramic substrate MCM)
* MCM-D (Deposited MCM)

MCM - L

* it is the oldest technology
* it is an advanced PCB which IC are mounted using COB (chip on board technology)
* it is less cost effective at higher densities where many additional layers are required.
* it is suitable technology for Applications which require low risk packing approach.

Advantages:

Low cost
high density
high performance

MCM-C

* The substrate fabrication is done with confirmed ceramic or glass ceramic technology
* due to excellent thermal conductivity and lower thermal expansions we use ceramic materials
* it is not Applicable for high end Applications

Advantages:

* Low cost
* high density
* high performance

MCM-D

* This consists of substrates which have high density thin films metal and low dielectric materials like silicon.
* Several dielectric / metalization technologies were involved.

Advantages:

* high performance
* high density

Disadvantages:

* high Cost

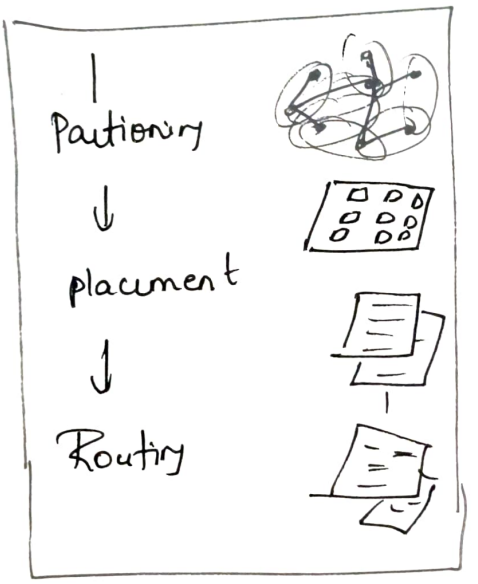
MCM physical design cycle:

MCM input = Circuit design

MCM output = layout design

Physical design cycle

1. partioning
2. placement
3. Routing



Partioning:

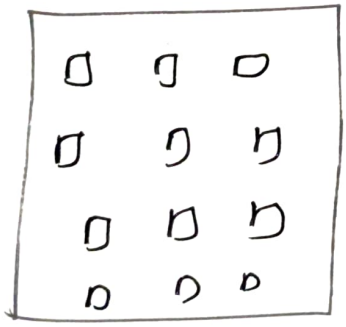
* The 1st Assignment of partion is to sub-divide the given circuit.
* Timing i/o pin count & power constraints.
* As a result area also will be added as one of the constraints
* it is performance driven

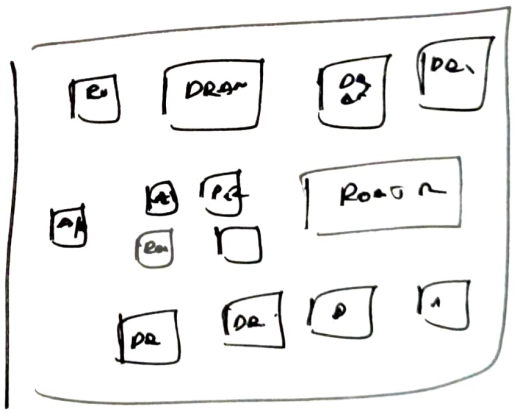
Placement

* Mapping of chips
* performance driven
* effects thermal characteristics.
* Due to that Over Routing efficiency

placement involves two ways

* chip Array based placement
* fixed Array based placement





Transponder:

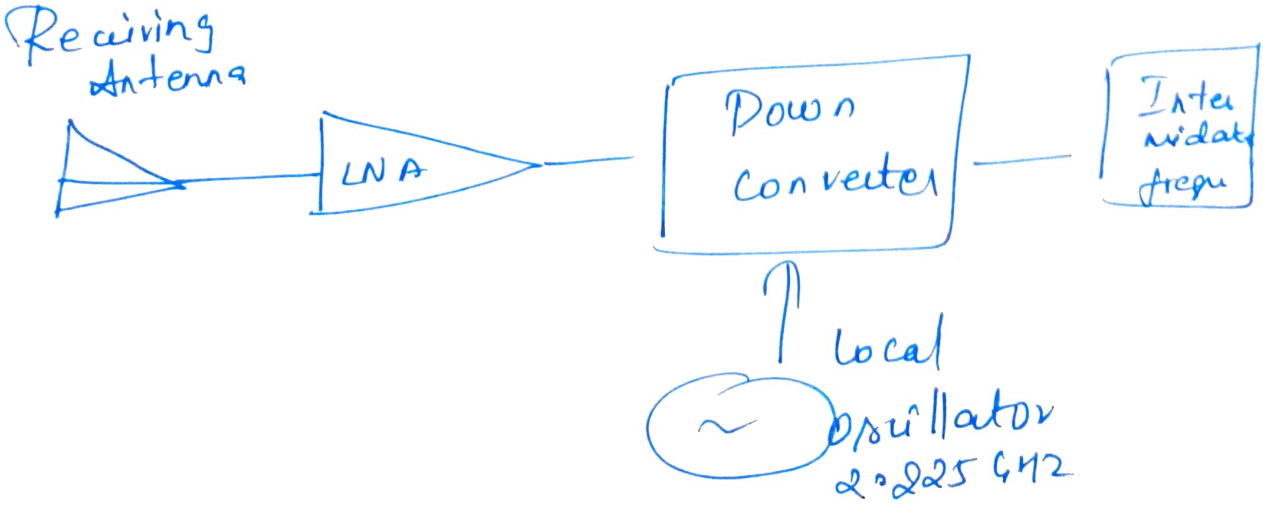
The transponder was invented during world war II by joining the terms transmitter & Responder.

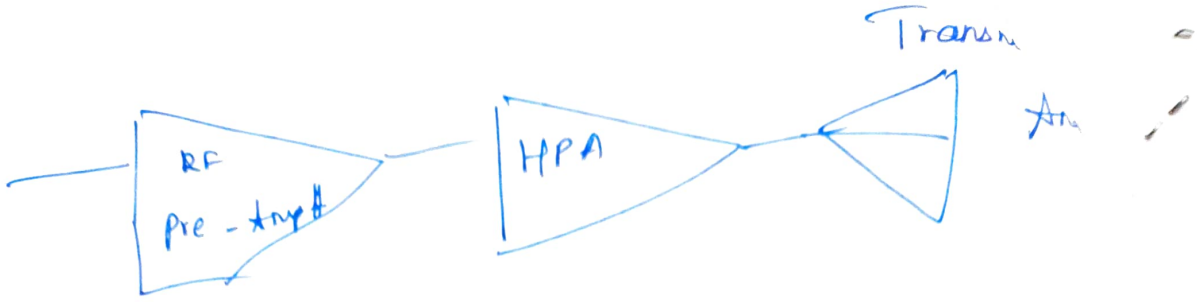
A control device that receives & responds automatically to an incoming signal is known as a transponder.

Transponders are used in a wide range of applications, including satellite communications, aviations.

The transponder performs both the transmitter & Responder functions within a satellite.

6/4 GHz Band Transponder Block diagram





* The intermediate frequency band pass filter receives the output signal as 4 GHz & removes the not required frequency signal

Transponder working principle

* Transponder works with radio frequencies & Responds to wireless monitoring, control devices signals and communications.

* The transponder automatically transmits back a radio signal at a fixed frequency.

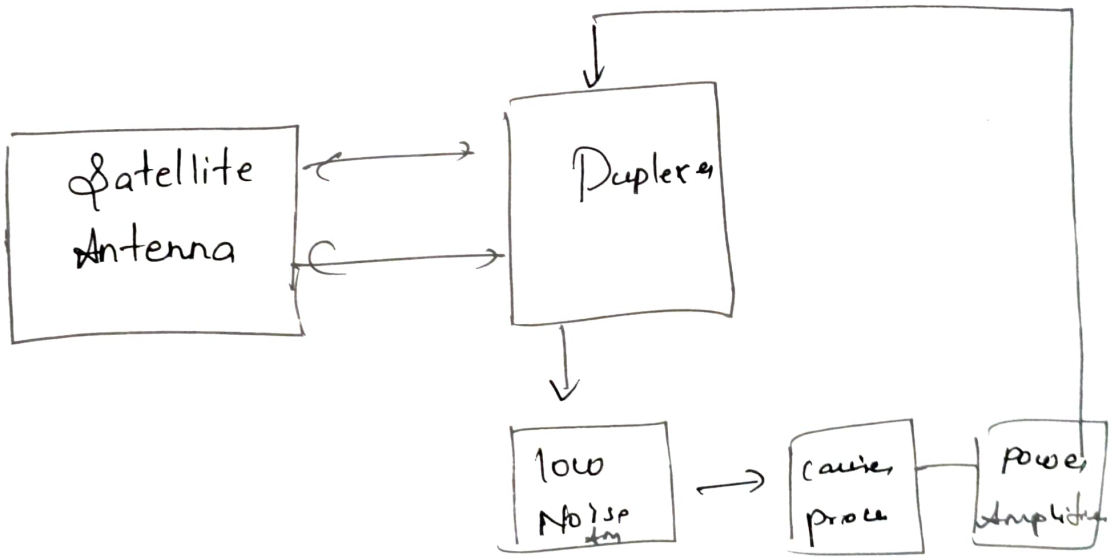
* To transmit & Receive signals Concurrently transmitting & Receiving signals should be set at dissimilar frequencies.

sponder types

different types of transponders used in different Communication Systems.

Satellite Transponder

Satellite Transponder receive signals from Earth - base stations. amplifies them and retransmits them back to Earth.

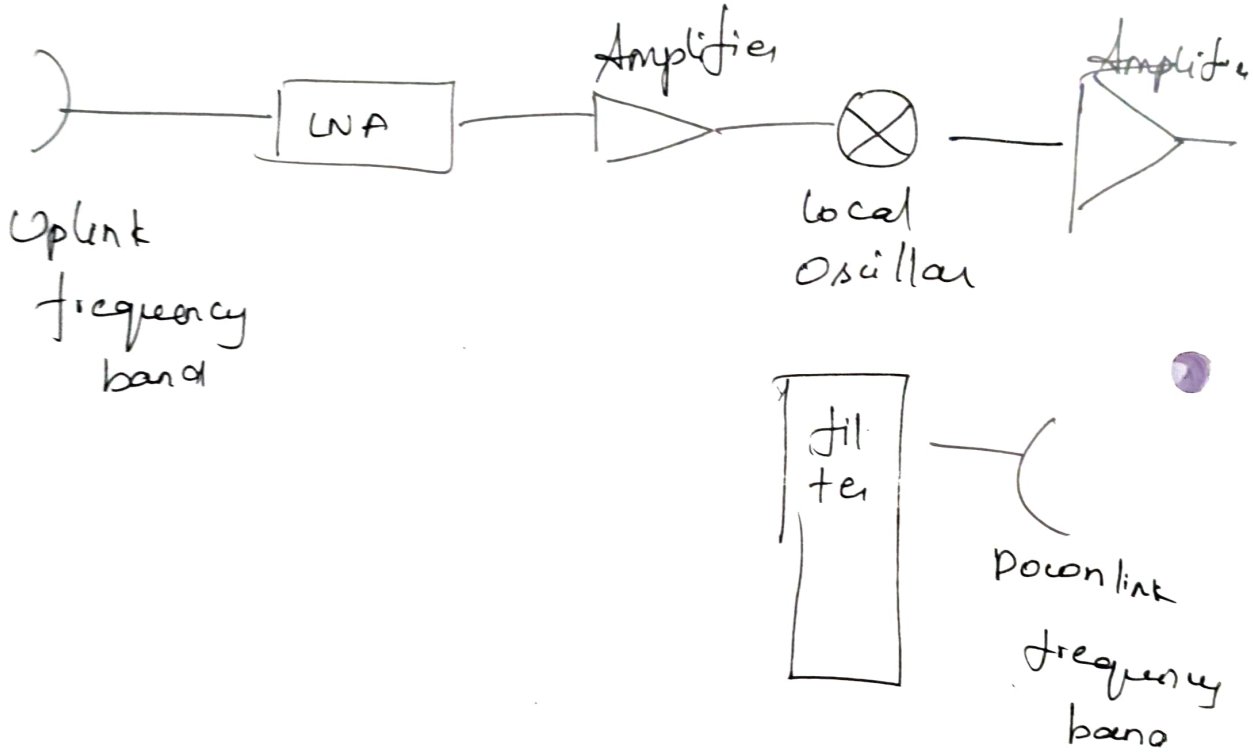


Satellite Antenna is used to transmit and receive the signals

Duplexer is a two way microwave gate that receives the Uplink signal from

Satellite antenna and transmits the downlink signal

signal Conversion Transponder

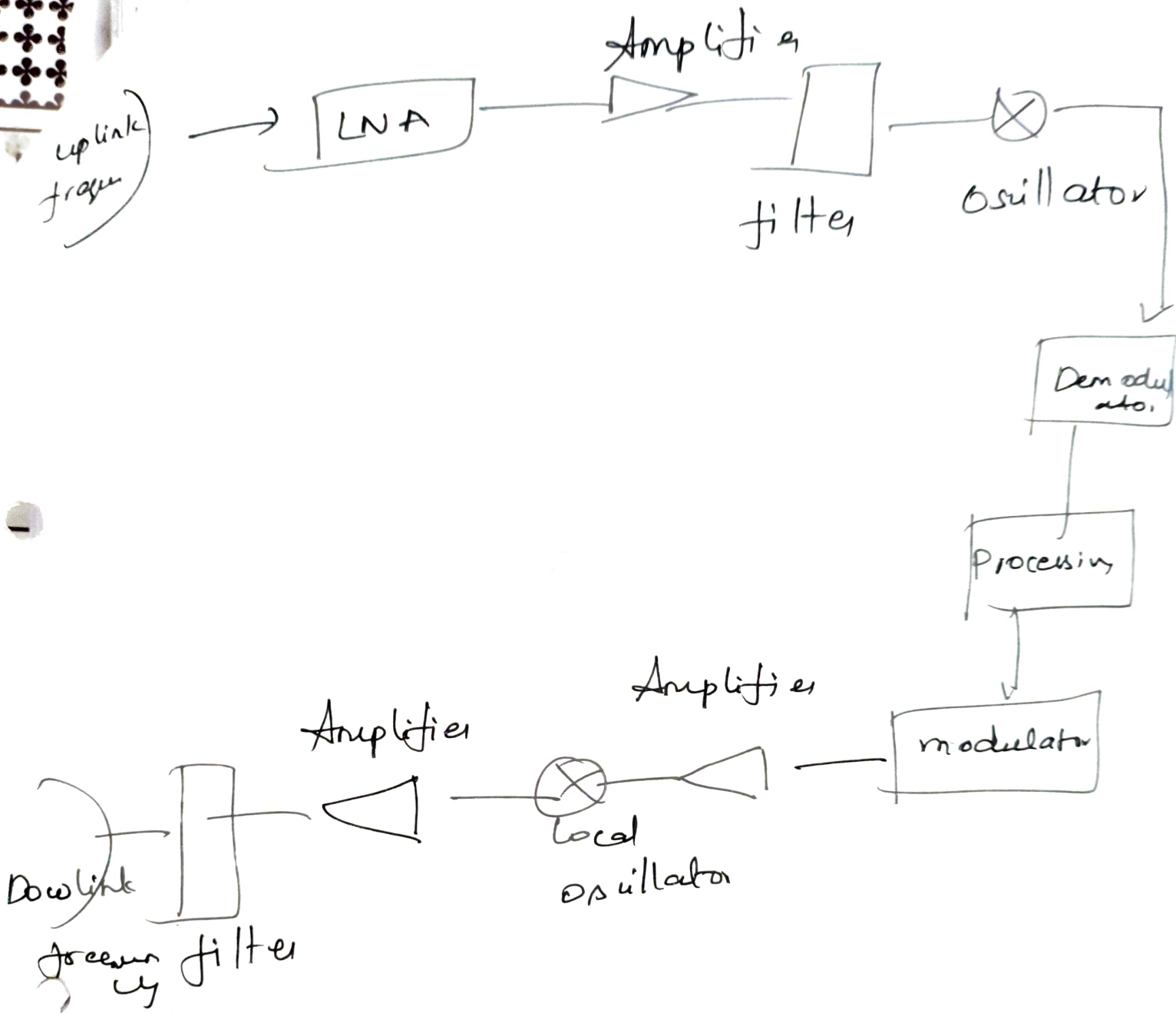


it is also known as bent pipe transponders. it recives a microwave frequency signal

Regenerative Transponder

it performs the function of a single Conversion transponder i.e

equency translation and Amplification



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023 – 2024
List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC156– Data Analysis and Visulaization

Course Coordinator : :Dr. R.Rajkumar

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	Test I
Section : C		**Course Handling Faculty :**Dr. R.Rajkumar		
1.	VTU21125	VAMSI KRISHNA REDDY KARUVADI	12	C
2.	VTU19603	YARAMALA BHARATH KUMAR REDDY	AB	C
3.	VTU20409	MUKKERA GOPI CHAND REDDY	2.5	C
4.	VTU20915	KARUTURI VENKATA KRISHNA SAIPAVAN	AB	C
5.	VTU21102	VANGA ADI VISHNU MANIKANTA	6	C
6.	VTU21153	SAIKRISHNA N	AB	C
7.	VTU20885	BANDARU ANAND JAGAN MOHAN RAO	AB	C
8.	VTU19685	GUGGILLA VINAYAK SRINIVAS	10.5	C
9.	VTU21212	CHAKALI ANIL KUMAR	AB	C
10.	VTU20893	SANGATHALA NAGA NITHIN KUMAR	AB	C

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero

Reason for Low Performance:

1. Lack of Attendance
2. Lack of writing practice

Action Planned:

1. Planned to conduct special class
2. Planned to give test

Faculty Signature **Course Coordinator** **HOD ECE**

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DEPARTMENT OF ECE
VTR UGE 21B. TECH – ECE
SUMMER 2023 – 2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10212EC156– Data Analysis and Visulaization

Course Coordinator : :Dr. R.Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA			
			T 2	T 3		End Semester Result
Section : C		**Course Handling Faculty : Dr. R.Rajkumar**				
1.	VTU21125	VAMSI KRISHNA REDDY KARUVADI	18	18		D
2.	VTU19603	YARAMALA BHARATH KUMAR REDDY	a	a		NE
3.	VTU20409	MUKKERA GOPI CHAND REDDY	a	1		D
4.	VTU20915	KARUTURI VENKATA KRISHNA SAIPAVAN	2	2		D
5.	VTU21102	VANGA ADI VISHNU MANIKANTA	a	a		D
6.	VTU21153	SAIKRISHNA N	5	11		D
7.	VTU20885	BANDARU ANAND JAGAN MOHAN RAO	2	1		D
8.	VTU19685	GUGGILLA VINAYAK SRINIVAS	8 1/2	13 1/2		D
9.	VTU21212	CHAKALI ANIL KUMAR	10	15		D
10.	VTU20893	SANGATHALA NAGA NITHIN KUMAR	14	a		RA

Action Taken:
Conducted the Revision Classes
Gave class test

Improvements Observed:

Faculty In-Charge **Course Coordinator** **HOD / ECE**

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTR UGE 2021

Slow Learners Remedial Class Time Table

Course Title :DATA ANALYSIS AND VISUALIZATION CourseCode:10212EC156

Course Handling Faculty: Dr. M.Anto Bennet Academic Year:2023-2024

Course Coordinator : Dr. R.Rajkumar Semester : Summer

Date	Time
04.09.2023	4.45 PM – 5.35 PM
11.09.2023	4.45 PM – 5.35 PM
18.09.2023	4.45 PM – 5.35 PM
02.10.2023	4.45 PM – 5.35 PM
09.10.2023	4.45 PM – 5.35 PM
16.10.2023	4.45 PM – 5.35 PM

Faculty **Course Coordinator** **HOD ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10212EC156&DATA ANALYSIS AND VISUALIZATION

Course Coordinator : Dr.R.Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : B /Slot:2		**Course Handling Faculty :**Dr. M.Anto Bennet		
1.	VTU20273	JYOTHI JAGADEESHWAR REDDY	C	13
2.	VTU20302	NIDADAVOLU VENKATA BHANU	C	10
3.	VTU20685	BANDI ANAND REDDY	C	00
4.	VTU20907	RAMELLA SASI KIRAN	C	00
5.	VTU20912	POTTUPOTHU CHAITANYA VENKATA	C	00
6.	VTU21027	POCHA NALLAYAGARI ROHINI	C	00
7.	VTU21162	MYLABATHULA CHANDANA	C	00

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. Irregular to the class
2. Lack of attention and focus in class

Action Planned:

- Planned to conduct Special classes.
- Planned to conduct slip test.
- Planned to give more practice

Faculty Signature **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC156- Data Analysis and Visualization

Course Coordinator : Dr.R.Rajkumar

S. No.	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : d		**Course Handling Faculty :** Dr.V.Gnanaprakash		
1.	VTU19866	KATKOJU AJAY KUMAR	C	10
2.	VTU19959	MANEPALLI VENKATA SAI KRISHNA	C	10
3.	VTU20647	VENNAPUSA SIVA REDDY	C	9
4.	VTU20969	DUDALA SIVA SANKAR REDDY	C	AB
5.	VTU21043	BETHINA BHANU KRISHNA MOULI	C	AB
6.	VTU21077	YARRAPOTHU PAVAN ADITHYA	C	AB
7.	VTU21090	KAKUMANI SRINU	C	AB
8.	VTU21114	VAISHNAVI K	C	AB
9.	VTU21142	HARISH R	C	10
10.	VTU21165	VARDHANAPU CHANDAN MANOJ	C	12
11.	VTU21233	DAVU SAI KUMAR	C	AB
12.	VTU21234	PULI THARUN MANIKANTA SAI	C	AB
13.	VTU21275	SHAIK LATHEEF	C	AB

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:
Slow learners are irregular to the class and exhibit lack of interest in studies.

Action Planned:
Planned to give more practice by conducting test.
Planned to give revision after syllabus completion.

Faculty **Course Coordinator** **HOD Sign**

CLASS: IV, SEC 'D' SEM.: SUMMER 2023-24 COURSE: DATA ANALYSIS AND VISUALIZATION

	Roll No. VTU ND	Name SLOW LEARNERS	Month	AUG		SEP				OCT
			Date	23	30	13	20	27	4	11
			Hour	B	B	B	B	B	B	B
1	19866	KATTOJU AJAY KUMAR		/	/	a	a	/	a	/
2	19959	MANEPALLI VENKATA SAI KRISHNA		/	/	/	/	/	a	/
3	20647	VENNAPUSA SIVA REDDY		a	a	a	a	a	a	a
4	20969	DUDLA SIVASANKAR REDDY		a	/	a	a	a	a	a
5	21043	BOTHINA BHANU KRISHNA MOHIT		a	a	/	a	/	/	/
6	21074	MARRAPOTHU PAVAN ADITHYA		a	/	/	/	/	/	/
7	21090	KATUMANI SRINU		a	/	a	a	/	/	/
8	21114	VAISHNAVI K		/	/	/	a	/	/	a
9	21142	HARISH R		a	a	/	/	/	a	a
10	21165	VARDHANAPU CHANDAN MANOJ		/	/	/	a	/	a	/
11	21233	DAVU SAI KUMAR		a	/	/	a	a	a	/
12	21284	PULI THARUN MANIKANTA SAI		a	/	/	a	/	/	/
13	21275	SHAIK LATHEEF		a	a	/	a	/	/	a
14										
15	23/8/23	Data type portability								
16	30/8/23	cluster analysis								
17	13/9/23	cluster algorithm								
18	20/9/23	Time series preparation								
19	27/9/23	Time series clustering								
20	4/10/23	Data abstraction								
21	11/10/23	Visual Encoding								
22										
23										
24										
25										
26										
27										
		No. of Absentees		9	4	4	10	8	7	5
		Initials								

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
SUMMER SEMESTER 2023 – 2024
SLOW LEARNERS TIME TABLE

Dr.V.Gnanaprakash

Day/Hour	I 8:45 am - 9:35 am	II 9:45 am - 10:35 am	III 10:45 am - 11:35 am	IV 11:45 am - 12:35 pm	LUNCH	V 1:45 pm - 2:35 pm	VI 2:45 pm - 3:35 pm	VII 3:45 pm - 4:35 pm	VIII 4:45 pm - 5:35 pm
Monday									
Tuesday									
Wednesday									DAV
Thursday									
Friday									
Saturday									

HOD ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title :10212EC156 / DATA ANALYSIS AND VISUALIZATION
Course Coordinator : Dr. R Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : E		**Course Handling Faculty :Dr C Raja**		
1.	VTU20801	Shaik Ayaz	C	AB
2.	VTU20926	Kaniyampati Veera Hemanth Kumar	C	1
3.	VTU21182	Mittameedi Naveen	C	AB
4.	VTU20772	Bathala Ganesh	C	3
5.	VTU21089	MarumanthiSyam Prasad	C	8
6.	VTU20777	Vuyyuru Kumara Swamy	C	AB

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Slow learners have difficulty in grasping the new concepts related to basics of Data Science

Action Planned:

Given class test for practice

Give revision after syllabus completion

Faculty (Dr. C. RAJA)

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title :10212EC156 / DATA ANALYSIS AND VISUALIZATION
Course Coordinator : Dr. R Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Test II	Test III
Section : E		Course Handling Faculty :Dr C. Raja		
1.	VTU20801	Shaik Ayaz	AB	8.5
2.	VTU20772	Bathala Ganesh	3	14
3.	VTU21089	MarumanthiSyam Prasad	8	AB
4.	VTU20777	Vuyyuru Kumara Swamy	AB	10

Criteria for slow learners: Category 'C' &Failures in TEST 1 (Consider absent as zero mark)

Faculty

(Dr. C. RAJA)

Course Coordinator

HOD Sign

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R&D Engineering Science & Technology

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21
10212EC156 / DATA ANALYSIS AND VISUALIZATION

SLOW LEARNERS REMEDIAL CLASS Time Table

	I 8.45 9.35	II 9.45 10.35	III 10.45 11.35	IV 11.45 12.35		V 1.45 2.35	VI 2.45 3.35	VII 3.45 4.35	VIII 4.45 5.35
Mon									
Tue									
Wed									
Thu									
Fri						SL (Sec D)			
Sat									

Slow learners class

Fri 1.45 pm

CLASS: III E SEM: V COURSE: DAV

			Month	Sep			Oct				
			Date	8	15	29	6	13			
			Hour	6	6	6	6	6			
1.	VTU20501	Shaik Ayaz		1	2	3	4	A			
2.	VTU20126	K.V. Hemanth Kumar		1	A	2	M	D			
3.	VTU21152	M. Naveen		A	1	2	A	A			
4.	VTU20172	B. Ganesh		A	1	2	3	4			
5.	VTU21089	M. Syam Prasad		A	2	A	A	A			
6.	VTU24777	V. Kumara Swamy		1	2	3	4	5			

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC156 Data Analysis and Visualization

Course Coordinator : Dr R Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr S Jana		
1.	VTU19002	YALAGALA JANAKI RAMAIAH	C	AB
2.	VTU20799	PATCHAVA MANOJ KUMAR	C	AB
3.	VTU21113	PRADEEPA G	C	AB
4.	VTU21143	RANJANI S	C	12.5

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

Slow learner students are irregular to the class and exhibit lack of interest in studies.

Action Planned:

Give Important questions for writing practice

Give revision after syllabus completion

Faculty **Course Coordinator** **HOD Sign**

Unit-3

Part A

1) Define time series data.

Time series data type of data that consists of observations or measurement recorded or collected at specific time intervals or time points. Time series data is commonly used in various Field, including Finance.

2. what are the attributes of contextual data representation:

contextual attribute (s): ~~eeo~~ contextual attributes provide the reference point which the behavioral value are measured.

Eg: Time instants at which measurement are made

3. Define Multivariate Time series Data.

(Multivariate time series data) A time series of length n and dimensionality d contains of numeric Features at each n time stamps.

List the methods of time series preparation.

→ Handling Missing values

→ Noise Removal

- Binning
- Moving-Avaraye smoothing
- Normalization.

5) what is differencing method? what is it used for?

In what differencing time series value y_i is replaced by the difference between it and the previous ~~pe~~ $y'_i = y_i - y_{i-1}$

Part-B

Summarize the methods of time series classification in detail.

→ Feature Based Methods:

1) Statistical Features:- extract statistical measures and Mean, variance, skewness.

2) Frequency Domain Features:

utillize domain like Fast Fourier transform (FFT) to convert time domain data into frequency domain.

3) Wavelet transform:

Decompose the time series into different frequency components using wavelet transform. extract features from these components and them for classification.

2) → Distance - Based Methods:

1) Dynamic time warping (DTW)

Measures the similarity between two time series sequences that any vary time or speed.

→ Model-based Method:

1) Hidden Markow Models (HMM):-

Model time series data as a sequence of hidden states, each producing observable output certain probabilities HMM are useful when system.

2) Markov Models:

similar to HMMs but without hidden states.

→ Deep learning Methods:

1) Recurrent Neural Network (RNNs)

Especially long short-Term Memory network (LSTMs) and gated Recurrent units (GRU) are effective capturing temporal.

2) 1D convolution Neural Network (CNNs)

use 1D convolution to automatically learn feature gatete from ram time series data.

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List of Slow Learners – Action Planned & Action Taken Report

Date after MT I: 23.08.2023

Course Title : **DATA SCIENCE AND VISUALIZATION**
Course Code : **10212EC228** Academic Year :2023-2024
Semester : Summer
Course Coordinator: Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Category	Performance in T- 1 CIA
Slot : S4		**Course Handling Faculty : Dr. Mariya Celin TA**		
Nil				

Criteria : Category C and Failures & Absentees for Test-I (considering Absent as Zero)

Reason for Low Performance:

NA

Action Planned:

NA

Action Taken:

NA

Course Coordinator

HOD Sign

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC228 & DATA SCIENCE AND VISUALIZATION

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Section : A		**Course Handling Faculty :** Dr. Ajisha M		
Nil				

Criteria for slow learners: Category 'C' & Failures in TEST 1

Faculty Signature **Course Coordinator** **HOD/ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R15 B. TECH – ECE
SUMMER 2023-2024

List of Slow Learners – Action Planned Report

Course Code and Title : 10212EC228 –DATASCIENCE AND VISUALIZATION

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student	
			Category	Test I
Slot : S2		**Course Handling Faculty :**R.Srinath		
1.	VTU20821	UPPUTURU JAGADEESH SAI	C	1
2.	VTU20198	VUDDANDAPU PRASANTH	C	7.5
3.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	C	8

Criteria for slow learners: Category 'C' & Failures in TEST 1 (Consider absent as zero mark)

Reason for Low Performance:

1. They are irregular to the class.
2. Lack of preparation by students.

Action Planned:

1. Planned to share Question Bank (FAQ) and Notes.
2. Conduct More tutorials in Special Classes.
3. Conduct Slip Test.

Faculty **Course Coordinator** **HOD Sign**

Slow learners Attendance

Evening class

CLASS: III Year SEM.: 823-24 COURSE: DSV

	Roll No.	Name	Month	AUG		SEP		OCT			
			Date	26	26	9	9	23	23	4	14
			Hour								
1	20821	U. JAGADEESH SAI		1	2	AB	AB	3	4	AB	AB
2	20198	V. PRASANTH		1	2	AB	AB	3	4	AB	AB
3	20956	C. KUSUMA NAGAKUMAR		1	2	3	4	5	6	7	8
4											
5											
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25											
26											
27											
		No. of Absentees		0	0	2	2	0	0	2	2
		Initials									

SPl. Class for slower learners

Record of Class Activities

S. No.	Date	Topics Covered	Content Delivery Method	Assessment Method	Learning Resources	C.C./M.C. Sign.	HOD Sign.
1.	26.8.23	Datascience Process	PPT	—	T2,R2		
2.	9.9.23	Clustering Algorithm	PPT	—	T2, R1		
3.	23.9.23	Removing, Renaming cleaning Rows & Column	PPT	—	T2, R2		
4.	14.10.23	D3.JS for Data visualization Loops & GIF	PPT	—	T2,R2		

SCHOOL OF ELECTRICAL AND COMMUNICATION
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SUMMER 2023-2024

List of Slow Learners – Action Taken Report

Course Code and Title : 10212EC228 –DATASCIENCE AND VISUALIZATION

Course Coordinator:Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Test II	End Semester Result
Slot : S2		**Course Handling Faculty : Dr.R.Srinath**		
1.	VTU20821	UPPUTURU JAGADEESH SAI	AB	D
2.	VTU20198	VUDDANDAPU PRASANTH	08	D
3.	VTU20956	CHIRRA KUSUMA NAGA KUMAR	16	C

Action Taken:

1. E-Books were Shared
2. Shared Notes for all units
3. Important concepts were discussed.

Improvements Observed:

There is a Slight Improvement Seen in the marks of students

Faculty **Course Coordinator** **HOD Sign**

SLIP TEST

VTU 20821
U. Jagadeesh Sai

What is data science, give its brief history and benefits?

Ans:- Data science:

→ Data science combines math and statistics, specialized programming, advanced analytics, Artificial intelligence (AI) & machine learning with specific subject matter expertize to uncover actionable insights hidden in the organization's data. these insights can be used to guide decision making and strategic planning.

→ It is a multidisciplinary approach that combines principles and practices from the fields of mathematics, statistics, artificial intelligence (AI) and computer engineering to analyze large amounts of data.

→ In a nut shell data science is data gathering, analysis & decision-making.

→ It tries to collect meaning from the data.

History:

→ In late 60's statistics was used an alternative for data science.

→ In late 90's, computer science (specializ)* Professionals formalized the term. A proposed definition for data science saw it as a separate field with three aspects: data design, collection, and analysis. It still took another decade for the term to be used outside of academia.

→ Artificial intelligence and machine learning innovations have made data

cross-functional skillset and expertise required, data scienc
strong projected growth over the coming decades.

Benefits:

Discover unknown transformative patterns:

⇒ Data science allows businesses to uncover new patterns &
relationships that have the potential to transform the organ
It can reveal low-cost changes to resource management for
impact on profit margins.

Innovate new products & solutions:

Data science can reveal gaps and problems that would other
go unnoticed. Greater insight about purchase decisions, cust
feedback, and business processes can drive innovation in inter
operations & external solutions.

Real-time optimization:

It's very challenging for business, especially large-scale enterpris
to respond to changing conditions in real-time. this can cau
significant losses or disruptions in business activity. Data
science can help companies predict change & react optimally
to different circumstances.

2) Explain the ways in which a data is studied in data science?

A) Data science is used to study the data in four ways.

they are: (i) Descriptive Analysis
(ii) Diagnostic Analysis
(iii) Predictive Analysis
(iv) Prescriptive Analysis

(i) Descriptive analysis:

* To gain insights into what happened or what is happening in the data environment.
* Data visualizations such as pie charts, bar charts, line graphs, tables or generated narratives is used.

(ii) Diagnostic analysis:

* Detailed data examination to understand why something happened.
* Techniques such as drill-down, data discovery, data mining & correlations may be used.

(iii) Predictive analysis:

* Historical data to make accurate forecasts about data patterns that may occur in the future.
* Techniques such as the machine learning, forecasting, pattern matching & predictive modeling is used.

(iv) Prescriptive analysis:

* Prescriptive analysis takes predictive data to the next level. It not only predicts what is likely to happen but also suggests an optimum response to that outcome. It can analyze the potential implications of different choices and recommend best course of action.
* Graphs analysis, simulation, complex event processing, neutral networks & recommendation engines from machine learning are used.

3) What is ETL, explain. Differentiate the same with data engineering Pipelines?

Ans)

ETL → Extract, transform and load.

ETL Pipeline is the most common architecture that has been here for decades.

with raw data from

Transform – standardizing data. Having data extracted, s
transform it to meet the format requirements. Data trans
significantly improves data discoverability & usability.

Load – saving data to a new destination. After bringing data
a usable state, engineers can load it to the destinat
typically a database management system (DBMS) or
warehouse.



ETL Pipeline

Data engineering pipeline VS ETL

Data engineering Pipeline	ETL
* Data pipelines main goal is to efficiently transmit data from sources like web applications & business processes, to storage locations, like data warehouses.	* Data must always be extracted, transformed & then loaded into the intended destination system through an ETL.
* Data pipelines have a wide range of uses & are found in numerous sectors of the data-driven economy.	* For BI specialists & data analysts, on the other hand, who must collect a huge sea of dispersed data in its raw form & delivers it all together as a single source of truth, ETL is of utmost importance.

4) How do data engineering pipelines & infrastructure support Data science initiatives?

A:) Data engineering Pipelines and infrastructure:

what happens inside a data Pipeline - The raw data loaded from a source may not be always accurate and useful. The datapipeline cleans and transforms the data to be useful for further Processing.

A data pipeline is a method for transferring data from one location (the source) to another (such as a data warehouse). Data is optimised and modified along the journey, eventually reaching a stage where it can be examined and used to generate business insights.

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SUMMER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J L Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		**Course Handling Faculty :** Dr. J L Mazher Iqbal		
1	VTU21789	RAVELLA JAGADISH	8.7	28
2	VTU21844	KAMABATHULA PAVAN TEJA	9.6	29
3	VTU22486	PATTABI NEELAKANTA	8.8	27
4	VTU22787	NAIDU SUSMITHA	9.1	27
5	VTU22917	DARSHAN P	9.2	26
6	VTU23246	DANDUGA MAHESHWAR REDDY	9.1	30
7	VTU23249	DANDUGA RAGHUNADHA REDDY	9.2	30
8	VTU23668	KORRAKUTI PENCHALA LAKSHMI NARASIMHA	8.9	28

Training / Activities Conducted for fast learners

- Also discussed the opportunities to develop their technical and teamwork skills
- Advised them to participate in conferences.

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 25

Improvement/ Achievement of fast learners

Few students got benefitted from the discussion and they are ready to work on conference/journal papers.

Faculty | Course Coordinator | HoD

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DEPARTMENT OF ECE
VTUR21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/ANALOG ELECTRONICS

Course Coordinator : DR HARIKRISHNA PAIK

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section :		Course Handling Faculty : Dr. Kanimozhi. T		
1.	VTU22856	MANISHA A	8.7	29
2.	VTU22812	KOLLA MOHAN	8.9	28
3.	VTU23784	PERURI VEERA VENKATA NAGA DURGA SRIKRISHNA	8.8	26
4.	VTU22254	SIDDESH B	8.9	27
5.	VTU22749	YETUKURI ANNAIAH	8.8	25
6.	VTU23447	YEDAMALA SRIHITH REDDY	8.7	27
7.	VTU23400	KADUKUNTLA RAMAKRISHNA REDDY	8.9	29
8.	VTU22895	KOLLURU HARSHA VARDHAN	8.8	26
9.	VTU23773	GURRAM N V V SANKAR BHAVANI	8.8	26
10.	VTU21963	CHENNU VENKATESWARA RAO	8.6	29

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 24

Training / Activities Conducted for fast learners
1. Advised them to score university ranks
2. Discussed gate questions and answers

Improvement/ Achievement of fast learners

All students performed well in CIA

Faculty Signature **CC Signature** **HOD Signature**

GATE SOLVED PAPER - IN

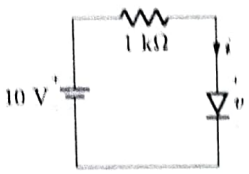
ANALOG ELECTRONICS

YEAR 2012 — ONE MARK

Q. 1 The I-V characteristics of the diode in the circuit given below are :

$$I = \begin{cases} \dfrac{V - 0.7}{500}\ \text{A} & V \geq 0.7\ \text{V} \\ 0\ \text{A}, & V < 0.7\ \text{V} \end{cases}$$

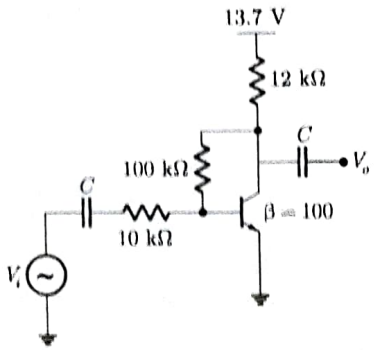
The current in the circuit is



(A) 10 mA
(B) 9.3 mA
(C) 6.67 mA
(D) 6.2 mA

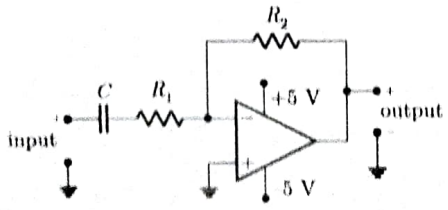
YEAR 2012 — TWO MARKS

Q. 2 The voltage gain A_v of the circuit shown below is



(A) $|A_v| \approx 200$
(B) $|A_v| \approx 100$
(C) $|A_v| \approx 20$
(D) $|A_v| \approx 10$

Q. 3 The circuit shown is a



mywbut.com

(A) low pass filter with $f_{3\,dB} = \dfrac{1}{(R_1 + R_2)C}$ rad/s

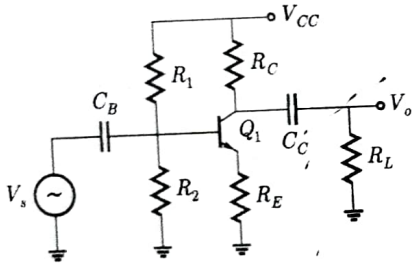
(B) high pass filter with $f_{3\,dB} = \dfrac{1}{R_1 C}$ rad/s

(C) low pass filter with $f_{3\,dB} = \dfrac{1}{R_1 C}$ rad/s

(D) high pass filter with $f_{3\,dB} = \dfrac{1}{(R_1 + R_2)C}$ rad/s

YEAR 2011 ONE MARK

Q. 4 The amplifier shown below has a voltage gain of -2.5, an input resistance of 10 kΩ, and a lower 3-dB cut-off frequency of 20 Hz. Which one of the following statements is TRUE when the emitter resistance R_E is doubled ?



(A) Magnitude of voltage gain will decrease

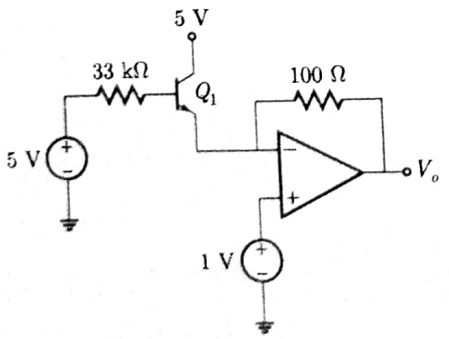
(B) Input resistance will decrease

(C) Collector bias current will increase

(D) Lower 3-dB cut-off frequency will increase

YEAR 2011 TWO MARKS

Q. 5 Assuming base-emitter voltage of 0.7 V and $\beta = 99$ of transistor Q_1, the output voltage V_o in the ideal opamp circuit shown below is



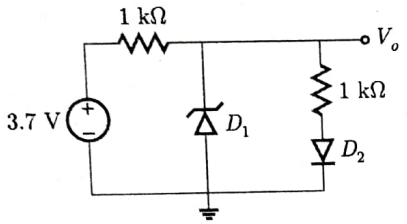
(A) -1 V

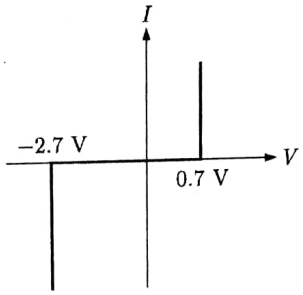
(B) $-1/3.3$ V

(C) 0 V

(D) 2 V

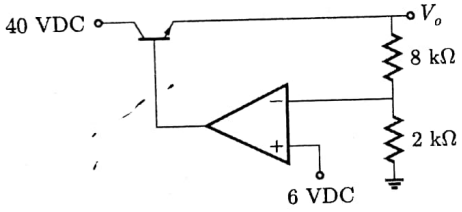
Q. 6 Assuming zener diode D_1 has current-voltage characteristics as shown below of the right and forward voltage drop of diode D_2 is 0.7 V, the voltage V_o in the circuit shown below is





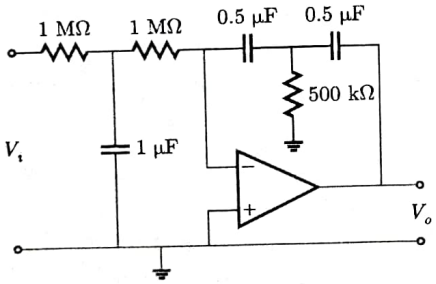
(A) 3.7 V
(B) 2.7 V
(C) 2.2 V
(D) 0 V

Q. 7 The value of V_o of the series regulator shown below is



(A) 24 V
(B) 28 V
(C) 30 V
(D) 32 V

Q. 8 The ideal opamp based circuit shown below acts as a

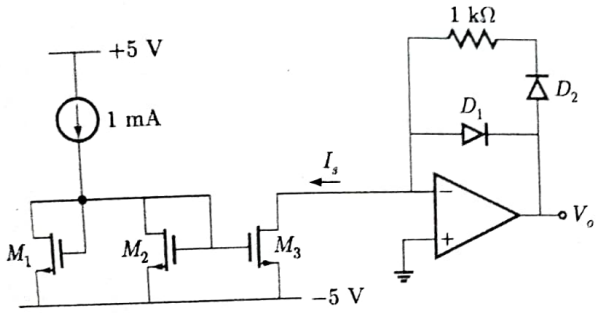


(A) low-pass filter
(B) high-pass filter
(C) band-pass filter
(D) band-reject filter

Common Data For Questions 9 and 10 :

M_1, M_2 and M_3 in the circuit shown below are matched N-channel enhancement mode MOSFETs operating in saturation mode, forward voltage drop of each diode is 0.7 V, reverse leakage current of each diode is negligible and the opamp is ideal.

mywbut.com



Q. 9 The current I_s in the circuit is

(A) -1 mA (B) 0.5 mA

(C) 1 mA (D) 2 mA

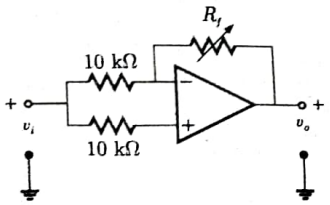
Q. 10 For the computed value of current I_s, the output voltage V_o is

(A) 1.2 V (B) 0.7 V

(C) 0.2 V (D) -0.7 V

YEAR 2010 ONE MARK

Q. 11 In the ideal op-amp circuit given in the adjoining figure, the value of R_f is varied from 1 $k\Omega$ to 100 $k\Omega$. The gain $G = \left(\frac{V_0}{V_i}\right)$ will

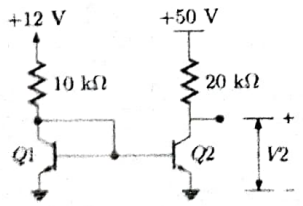


(A) remain constant at $+1$ (B) remain constant at -1

(C) vary as $(R_f/10,000)$ (D) vary as $(1 + R_f/10,000)$

YEAR 2010 TWO MARKS

Q. 12 The matched transistors $Q1$ and $Q2$ shown in the adjoining figure have $\beta = 100$. Assuming the base-emitter voltages to be 0.7 V, the collector-emitter voltage V_2 of the transistors $Q2$ is

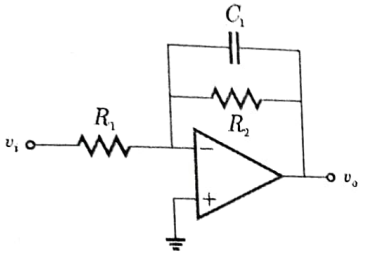


(A) 33.9 V (B) 27.8 V

(C) 16.2 V (D) 0.7 V

mywbut.com

Q. 13 An active filter is shown in the adjoining figure. The dc gain and the 3 dB cut-off frequency of the filter respectively, are, nearly

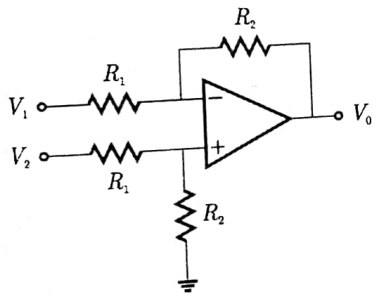


$R_1 = 15.9k\Omega$, $R_2 = 159\,k\Omega$, $C_1 = 1.0nF$

(A) 40 dB, 3,14 kHz
(B) 40 dB, 1.00 kHz
(C) 20 dB, 6.28 kHz
(D) 20 dB, 1.00 kHz

Common Data For Questions 14 and 15 :

A differential amplifier is constructed using an ideal op-amp as shown in the adjoining figure. The values of R_1 and R_2 are 47 $k\Omega$ and 470$k\Omega$ respectively.



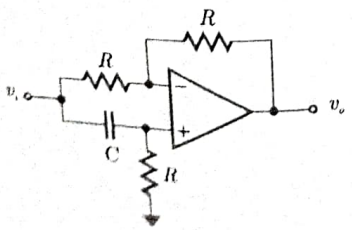
Q. 14 The input impedances seen looking into the terminals V_1 and V_2 with respect to ground, respectively are
(A) 47 kΩ 43 kΩ
(B) 47 kΩ and 47 kΩ
(C) 47 kΩ and 51 $k\Omega$
(D) 517 kΩ and 517 kΩ

Q. 15 V_1 and V_2 are connected to voltage sources having an open circuit of $+1V$ each and internal resistances of 13 kΩ and 3 kΩ respectively. The output voltage V_0 is
(A) 0 V
(B) 0.15 V
(C) 1.5 V
(D) 10 V

ONE MARK

YEAR 2003

Q. 16 The circuit shown in the figure is



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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC101 / Circuit Theory

Course Coordinator : Dr. J.L.Mazher Iqbal

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty :** Dr. S.SHIYAMALA		
1.	VTU21882	LEVIDI DEEPIKA	8.5	30
2.	VTU22084	PILLARAM NEHA REDDY	8.6	30
3.	VTU22382	MOPURI DEEPESH PAVAN REDDY	8.5	29
4.	VTU22746	CHAPPATI PADMA PRIYA	8.8	29
5.	VTU23099	P S DINESH KUMAR	8.6	30
6.	VTU23565	HARINI S	8.5	28.0
7.	VTU23670	PALA ROHINI	8.7	26.5
8.	VTU23741	YARRAGOLLA VENKATA SAI	8.6	27.5
9.	VTU23765	NAYUNIPATI DHARANESWARI	8.7	27.0
10.	VTU24177	ADURI VISHNU SREE PAVAN KOTESH	8.6	27

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Motivated the students to attend the technical competition
- Planned to solve more gate problems in Circuit Theory.

Improvement/ Achievement of fast learners

- Secured good marks in CIA tests and surely will give their best in University Exam.

Faculty **Course Coordinator** **HOD/ECE**

Organised by

Coordinated & Implemented by

INDIA INTERNATIONAL SCIENCE FESTIVAL 2023

17 to 20 January 2024
DBT THSTI-RCB Campus
NCR Biotech Science Cluster, Faridabad, Haryana

Science and Technology Public Outreach in Amrit Kaal

Certificate of Participation

This is to certify that Prof./Dr./Mr./Ms Y Venkata Sai from Vel Tech Dr. SR R&D Inst of Sci and Tech has successfully participated in Student Innovation Festival - Space Hackathon 2023 conducted from 17 to 19 January 2024 as a part of **9th India International Science Festival 2023** organised by Government of India's Ministry of Science & Technology, Ministry of Earth Sciences, Department of Space, Department of Atomic Energy and Government of Haryana in association with Vijnana Bharati (VIBHA).

Dr. Shekhar C. Mande
President, Vijnana Bharati

Prof. Abhay Karandikar
Secretary, Department of Science & Technology

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R15 B.TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

Course Code and Title :10211EC102/ANALOG ELECTRONICS

Course Coordinator : DR HARIKRISHNA PAIK

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section :		**Course Handling Faculty :** DR HARIKRISHNA PAIK		
1	VTU21752	G POORNA CHAITANYA	8.7	28
2	VTU23302	S PREETHIKA	8.8	25
3	VTU23626	K V S SUBRAHMANYESWARI	9.2	30
4	VTU23650	SURA RAKESH REDDY	8.9	29
5	VTU23741	YARRAGOLLA VENKATA SAI	8.9	29
6	VTU22808	CHILAKALA YASHWANTHI	8.8	30

Criteria for fast learners: CGPA greater than 8.5 and TEST1 greater than 24

Training / Activities Conducted for fast learners
1. Design of an diode clipper circuit
2. Design of an LF oscillator

Improvement/ Achievement of fast learners
1. students designed and simulated well

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
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VTR UGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : H		**Course Handling Faculty :** Dr. Ajisha M		
1.	VTU21368	EBENEZER R	9.67	29.5
2.	VTU21882	LEVIDI DEEPIKA	8.9	25
3.	VTU22084	PILLARAM NEHA REDDY	9.6	28
4.	VTU22176	KORUMILLI SAI SAMPATH	9.1	28

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Faculty Signature **Course Coordinator** **HOD/ ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Fast Learners– Action Taken Report

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : H		**Course Handling Faculty :** Dr. Ajisha M			
1	VTU21368	EBENEZER R	29	30	A
2	VTU21882	LEVIDI DEEPIKA	23.5	29	A
3	VTU22084	PILLARAM NEHA REDDY	28.5	30	B
4	VTU22176	KORUMILLI SAI SAMPATH	26	30	B

Action Taken:

1. Gate Questions and materials were shared
2. Discussed about how to present each and every question in the CIA tests and university exam.

Faculty Signature **Course Coordinator** **HOD/ECE**

GATE Questions on Analog Electronics

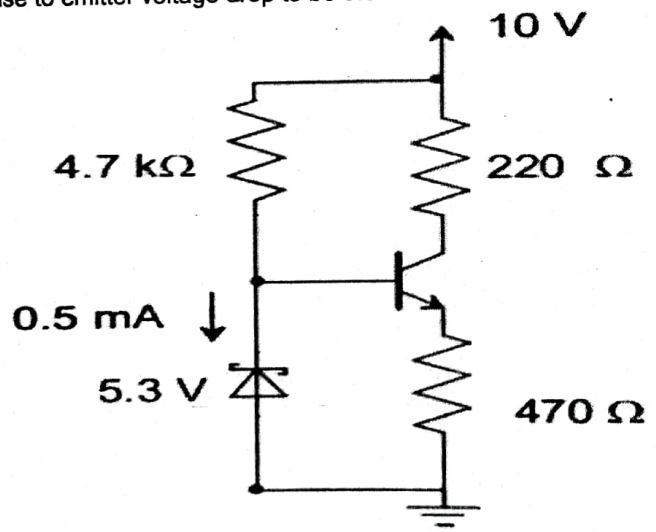
1. A sample-and-hold (S/H) circuit, having a holding capacitor of 0.1 nF, is used at the input of an ADC (analog-to-digital converter). The conversion time of the ADC is 1μsec, and during this time, the capacitor should not lose more than 0.5% of the charge put across it during the sampling time. The maximum value of the input signal to the S/H circuit is 5V. The leakage current of the S/H circuit should be less than _____.
   a. 2.5 mA
   b. 0.25 mA
   c. 25.0 μA
   d. 2.5 μA

   Answer (d)

2. Which of the following is true in an RC- coupled common Emitter amplifier?
   a. Coupling capacitance affects the high frequency (hF) response, and bypass capacitance affects the low frequency (lF) response
   b. Both coupling and bypass capacitance affect the lF response
   c. Both coupling and bypass capacitance affects the hF response
   d. Coupling capacitance affects the lf response, and the bypass capacitance affects the hF response

   Answer (b)

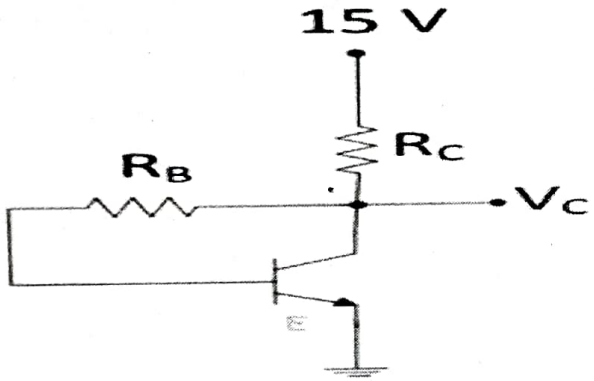
3. A transistor circuit is given below. The Zener diode breakdown voltage is 5.3 V as shown. Take base to emitter voltage drop to be 0.6 V. The value of the current gain β is _____.



   a. 1
   b. 0
   c. 11
   d. 19

   Answer (d)

4. In the given circuit, the silicon transistor has β =75 and a collector voltage VC=9V. Then the ratio of RB and RC is _____.



a. Between 0 and 100
b. Between 100 and 110
c. Between 0 and 1
d. None of the above

Answer (b)

5. When a bipolar junction transistor is operating in the saturation mode, which one of the following statements is TRUE about the state of its collector-base (CB) and the base-emitter (BE) junctions?
   a. The CB junction is forward biassed, and the BE junction is reverse biassed
   b. The CB junction is reverse biassed, and the BE junction is forward biassed
   c. Both CB and BE junctions are forward biassed
   d. Both CB and BE junctions are reverse biassed

Answer (c)

6. A bipolar junction transistor (BJT) is used as a power control switch by biassing it in the cutoff region (OFF state) or in the saturation region (ON state). In the ON state, for the BJT _____.
   a. Both the base-emitter and base-collector junctions are reverse biassed
   b. The base-emitter junctions are reverse biassed, and the base-collector junction is forward biassed
   c. The base-emitter junction is forward biassed, and the base-collector junction is reverse biassed
   d. Both the base-emitter and base-collector junctions are forward biassed

Answer (d)

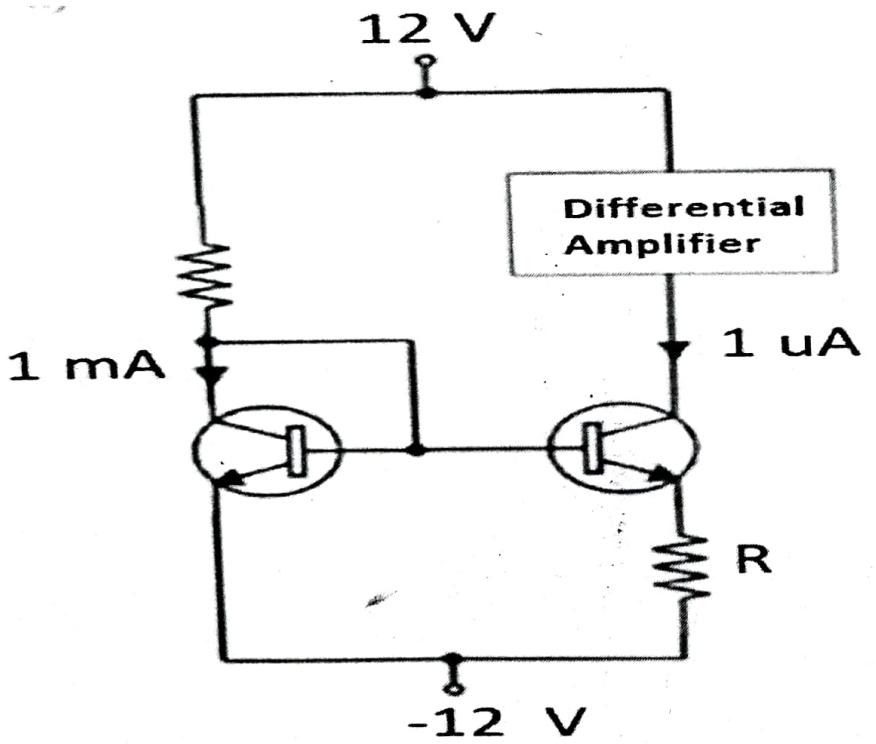
7. One of the applications of the current mirror is _____.
   a. Output current limiting
   b. Obtaining a very high current gain
   c. Current feedback
   d. Temperature stabilised biassing

Answer (d)

8. The depletion region (or) space charge region (or) transition region in a semiconductor p–n junction diode has _____.
   a. Electrons and holes
   b. Positive ions and electrons
   c. Positive and negative ions
   d. Negative ions and holes

   Answer (c)

9. The circuit shown in the figure uses matched transistors with a thermal voltage V_T=25mV. The base currents of the transistors are negligible. The value of the resistance R in kΩ that is required to provide 1μA bias current for the differential amplifier block shown is _____.

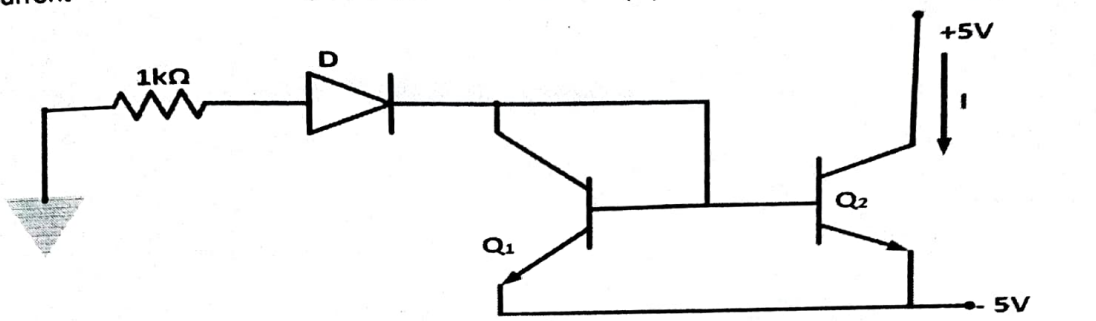


   a. 170 and 174
   b. 175 and 180
   c. 181 and 185
   d. 190 and 200

   Answer (a)

10. Two perfectly matched silicon transistors are connected as shown in the figure. Assuming the β of the transistors to be very high and forward voltage drop to be 0.7V, the value of

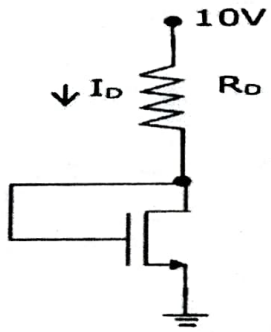
current I is (assume diode (D) is ideal) _____.



a. 0 mA
b. 3.6 mA
c. 4.3 mA
d. 5.7 mA

Answer (c)

11. For the n-channel enhancement MOSFET shown in the figure, the threshold voltage Vth=2V. The drain current ID of the MOSFET is 4 mA when the drain resistance RD is 1kΩ. If the value of RD is increased to 4Ω, drain current ID will become _____.



a. 2.8 mA
b. 2.0 mA
c. 1.4 mA
d. 1.0 mA

Answer (c)

12. An N-channel JFET having a pinch-off voltage (VP) of −5V shows a transconductance (gm) of 1 mA/V when the applied Gate to source voltage (VGS) is −3V. Its maximum transconductance (in mA/V) is _____.

a. 1.5
b. 2.0
c. 2.5
d. 3.0

Answer (c)

13. Of the four characteristics given below, which are the major requirements for an instrumentation amplifier?

P. High common mode rejection ratio

Q. High input impedance

R. High linearity

S. High output impedance

a. P, Q and R only
b. P and R only
c. P, Q and S only
d. Q, R and S only

Answer (a)

14. A low pass filter with a cutoff frequency of 30Hz is cascaded with a high pass filter with a cutoff frequency of 20Hz. The resultant system of filter coils function as _____.

a. All pass filter
b. An all-stop filter
c. A band stop filter
d. A Band pass filter

Answer (d)

15. The type of power amplifier which exhibits crossover distortion in its output is _____.

a. Class A
b. Class B
c. Class AB
d. Class C

Answer (b)

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DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/ Analog Electronics

Course Coordinator : Dr K.Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : J		Course Handling Faculty : Dr Ezhil E.Nithila		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.2	28.5

Criteria for fast learners: CGPA greater than 8.4 and Test 1 greater than 24

Faculty Signature

CC Signature

HOD Signature

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/ Analog Electronics

Course Coordinator : Dr K.Harikrishna Paik

S. No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End sem
Section : J		Course Handling Faculty : Dr Ezhil E.Nithila			
1	VTU21844	KAMABATHULA PAVAN TEJA	28.5	30	

Action Taken

1. GATE questions and materials were shared.
2. Discussed about how to present each and every question in the CIA and university exam.

Faculty Signature **CC Signature** **HOD Signature**

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102 & Analog Electronics

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		**Course Handling Faculty : Dr.S.Vijayalakshmi**		
1	VTU23397	CHITTEPU LINGESHWAR REDDY	9.4	26
2.	VTU23464	HEMANT SINGH	9.1	29
3.	VTU23631	BHAVESH RATHORE	8.8	30
4.	VTU23753	SACHIN KUMAR	8.5	27.5
5.	VTU23859	MUMMADI BHANU PRAKASH REDDY	8.2	25.5
6.	VTU23874	R J YESHMITAA	8.6	24
7.	VTU24296	THEERTHANA T	8.4	25.5

Training / Activities Conducted for fast learners

- Placement Oriented Activities conducted – Technical HR round Questions
- Advised them to participate in national level conference
- Guide them to publish papers in journals
- Mock Interviews

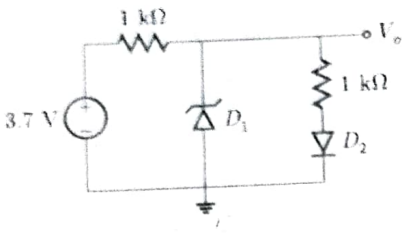
Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

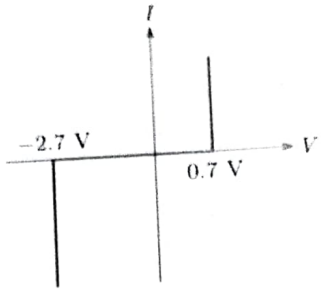
Improvement/ Achievement of fast learners

1. Topics are taught and discussed in line with GATE Exam and student standards were improvised.

Faculty Signature **CC Signature** **HOD Signature**

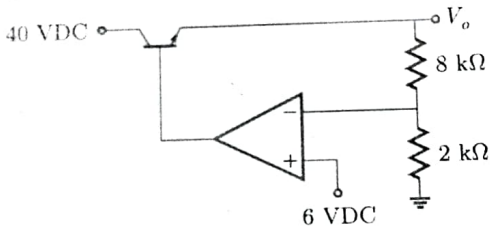
Q. 6 Assuming zener diode D_1 has current-voltage characteristics as shown below of the right and forward voltage drop of diode D_2 is 0.7 V, the voltage V_o in the circuit shown below is





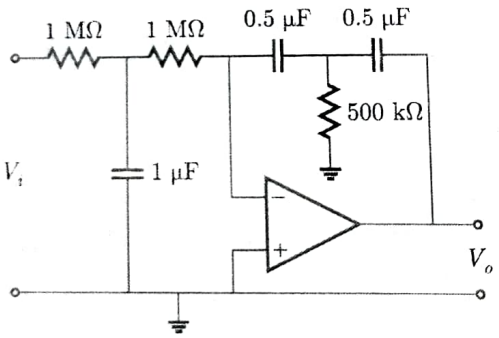
(A) 3.7 V
(B) 2.7 V
(C) 2.2 V
(D) 0 V

Q. 7 The value of V_o of the series regulator shown below is



(A) 24 V
(B) 28 V
(C) 30 V
(D) 32 V

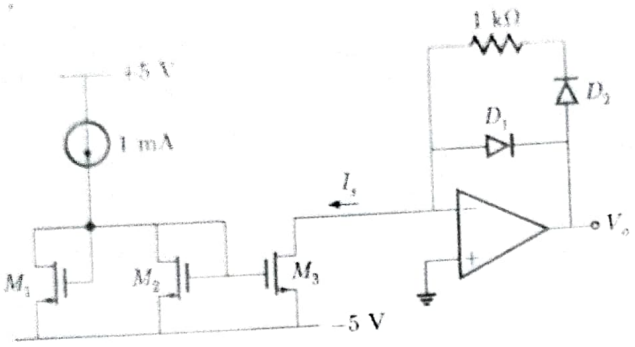
Q. 8 The ideal opamp based circuit shown below acts as a



(A) low-pass filter
(B) high-pass filter
(C) band-pass filter
(D) band-reject filter

Common Data For Questions 9 and 10 :

M_1, M_2 and M_3 in the circuit shown below are matched N-channel enhancement mode MOSFETs operating in saturation mode, forward voltage drop of each diode is 0.7 V, reverse leakage current of each diode is negligible and the opamp is ideal.



The current I_s in the circuit is

(A) -1 mA
(B) 0.5 mA
(C) 1 mA
(D) 2 mA

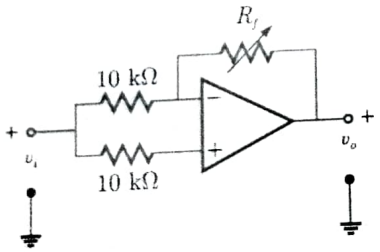
For the computed value of current I_s, the output voltage V_o is

(A) 1.2 V
(B) 0.7 V
(C) 0.2 V
(D) -0.7 V

ONE MARK

YEAR 2010

In the ideal op-amp circuit given in the adjoining figure, the value of R_f is varied from 1 $k\Omega$ to 100 $k\Omega$. The gain $G = \left(\frac{V_0}{V_i}\right)$ will

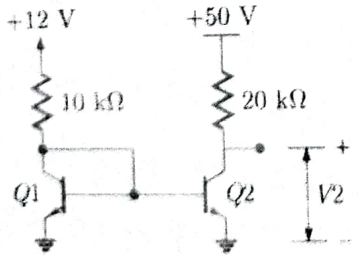


(A) remain constant at $+1$
(B) remain constant at -1
(C) vary as $(R_f/10,000)$
(D) vary as $(1 + R_f/10,000)$

TWO MARKS

YEAR 2010

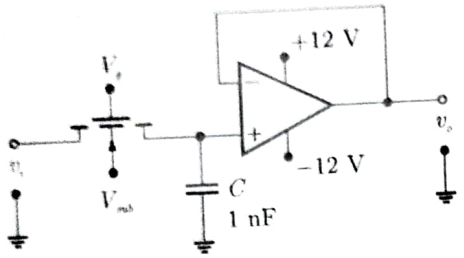
The matched transistors $Q1$ and $Q2$ shown in the adjoining figure have $\beta = 100$. Assuming the base-emitter voltages to be 0.7 V, the collector-emitter voltage V_2 of the transistors $Q2$ is



(A) 33.9 V
(B) 27.8 V
(C) 16.2 V
(D) 0.7 V

Common Data For Questions 20 and 21 :

The figure shows a sample-and-hold circuit using a MOSFET as a switch. The threshold voltage of the MOSFET as a switch. The threshold voltage of the MOSFET is +2 V. It has zero leakage current in the off state. Assume that the capacitor is ideal.



The input voltage V_i ranges from −5 V to +5 V. Appropriate values of V_{sub}, of V_g during hold are, respectively,

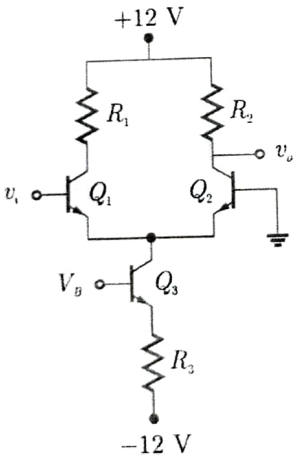
(A) $+12V \geq +7V$ and $\leq -3V$
(B) $-12V, \geq +3V$, and $\leq -7V$
(C) $+12V, \geq +3V$ and $\leq -7V$
(D) $-12V, \geq +7V$, and $\leq -3V$

The circuit is used at a sampling rate of 1 kHz, with an A/D converter having a conversion time of 200 ms. The op-amp has an input bias current of 10 nA. The maximum hold error is

(A) 1 mV
(B) 2 mV
(C) 5 mV
(D) 10 mV

Common Data For Questions 22 and 23 :

The circuit shown in the figure uses three identical transistors with $V_{BE} = 0.7$ V and $\beta = 100$. Given $R_1 = R_2 = R_3 = 1k\Omega, kT/q_e = 25mV$
.The collector current of transistor Q_3 is 2 mA.



The bias Voltage V_B at the base of the transistor Q_3 is approximately

(A) −9.3 V
(B) −10.0 V
(C) −10.3 V
(D) −11.0 V

The small signal voltage gain of the circuit is

(A) −20
(B) −40
(C) 20
(D) 40

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ANSWER KEY

ANALOG ELECTRONICS

1	2	3	4	5	6	7	8	9	10
(D)	(D)	(B)	(A)	(C)	(C)	(C)	(A)	(B)	(A)
11	12	13	14	15	16	17	18	19	20
(A)	(B)	(D)	(C)	(B)	(A)	(B)	(A)	(B)	(D)
21	22	23	24	25	26	27	28	29	30
(C)	(A)	(C)	(C)	(B)	(A)	(B)	(D)	(D)	(B)
31	32	33	34	35	36	37	38	39	40
(C)	(B)	(A)	(D)	(D)	(A)	(B)	(C)	(B)	(C)
41	42	43	44	45	46	47	48	49	50
(D)	(B)	(B)	(C)	(B)	(D)	(B)	(D)	(C)	(A)
51	52	53	54	55	56	57	58	59	60
(A)	(B)	(C)	(C)	(C)	(B)	(A)	(A)	(D)	(C)
61	62	63	64	65	66	67	68	69	70
(B)	(D)	(B)	(D)	(D)	(C)	(D)	(A)	(B)	(B)
71	72	73	74	75	76	77	78	79	80
(A)	(A)	(B)	(D)	(A)	(C)	(D)	(D)	(D)	(B)
81	82	83	84	85	86	87	88	89	90
(A)	(B)	(C)	(B)	(D)	(C)	(C)	(C)	(D)	(A)
91	92	93	94	95	96	97			
(A)	(C)	(B)	(B)	(B)	(D)	(A)			

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/Analog Electronics

Course Coordinator : Dr.Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		**Course Handling Faculty :** Dr.N.Vinodhkumar		
1	VTU23332	KONATHAM BHAVANI SHANKAR REDDY	8.6	25.5
2	VTU24349	POOJA.U	8.7	26.5
3	VTU24454	HARIHARAN G	8.6	26.5
4	VTU21678	NAVINA SRI U	8.6	28
5	VTU22509	RISHIKA M N	8.9	30

Training / Activities Conducted for fast learners

- Encouraged students to take up competitive exams like GATE, GRE, TOEFL, IELTS, CAT, PGCET etc.
- Also discussed the opportunities to develop their technical and teamwork skills by involving in various events in IEEE and IETE student chapter and Department Clubs
- Advised them to participate in conferences

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Few students got benefitted from the discussion
- They participated in technical events.

Faculty Signature

CC Signature

HOD Signature

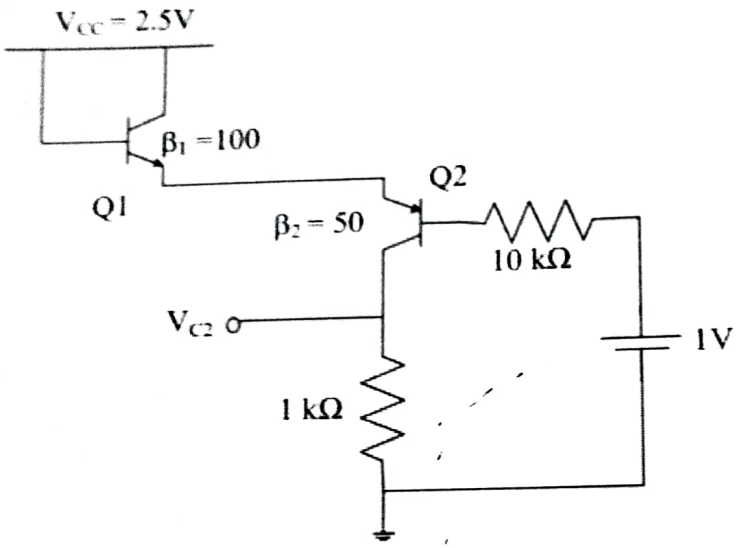
Analog Electronics

GATE questions for Fast Learners

Section J

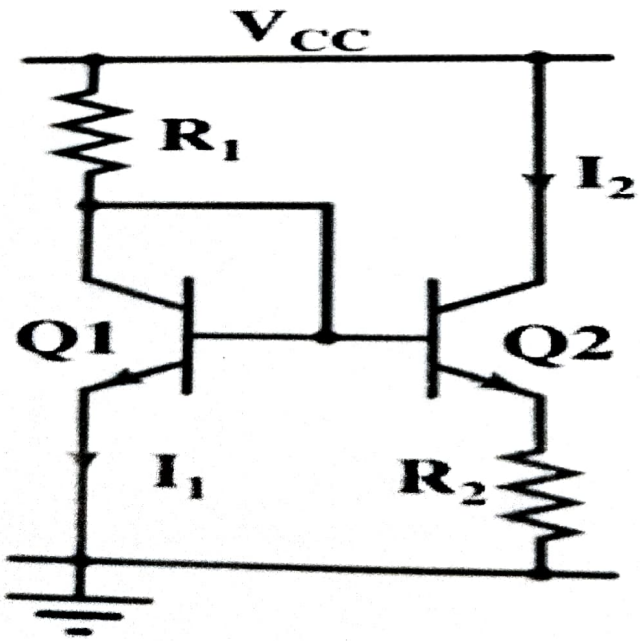
List of Questions:

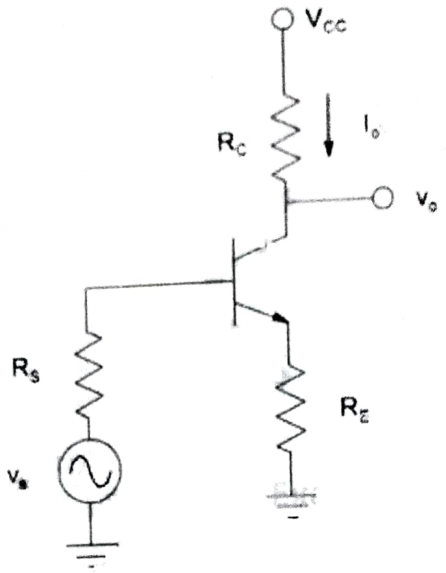
1) Consider the circuit shown in the figure. Assuming VBE1 = VEB2 = 0.7 volt, value of the dc voltage Vc2 (in volt) is _____



Correct answer is 0.5

2) Resistor R1 in the circuit below has been adjusted so that I1 = 1 mA. The bipolar transistor Q1 and Q2 are perfectly matched and have very high current gain, so their base currents are negligible. The supply voltage Vcc is 6 V. The thermal voltage kT/q is 26 mV.

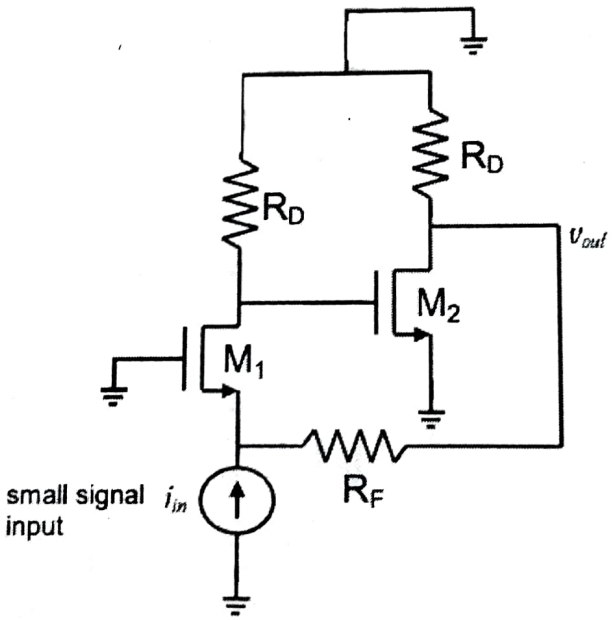




a) Voltage shunt feedback
b) Current series feedback
c) Current shunt feedback
d) Voltage series feedback

Correct answer isCurrent series feedback

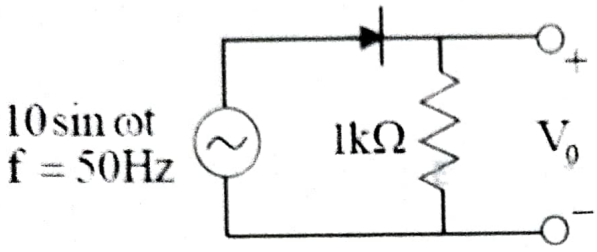
8) In the ac equivalent circuit shown in the figure, if i_F is very large, the type of feedback is



a) Voltage -Voltage feedback
b) Voltage- Current feedback
c) Current-Voltage feedback
d) Current-current feedback

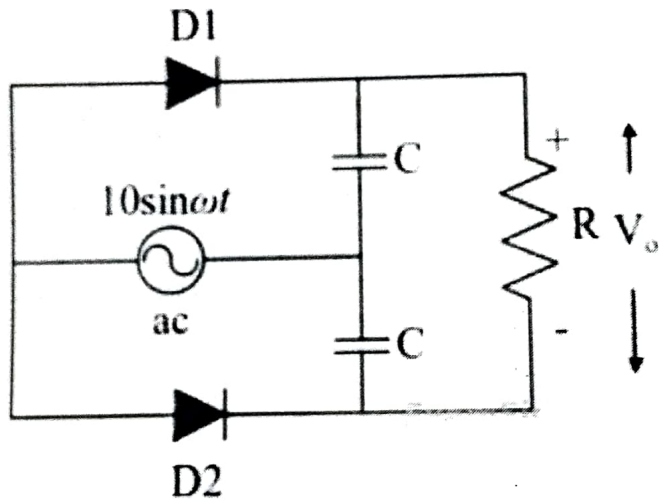
Correct answer is Voltage- Current feedback

9) The output V0 of the diode circuit shown in the figure is connected to an averaging DC voltmeter. The reading on the DC voltmeter in Volts, neglecting the voltage drop across the diode, is _____.



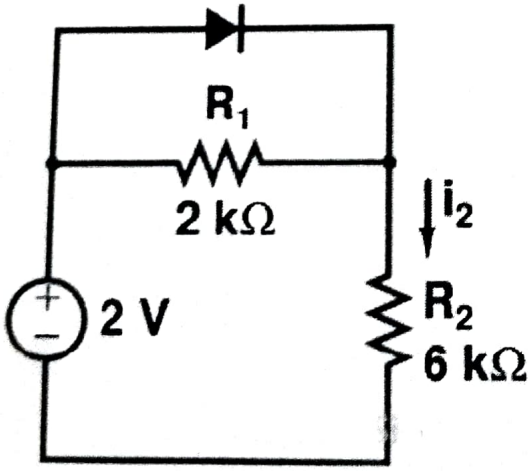
Correct answer is 3.18

10) The diodes D1 and D2 in the figure are ideal and the capacitors are identical. The product RC is very large compared to the time period of the ac voltage. Assuming that the diodes do not breakdown in the reverse bias, the output voltage V0 (in volt) at the steady state is_____.



Correct answer is 0

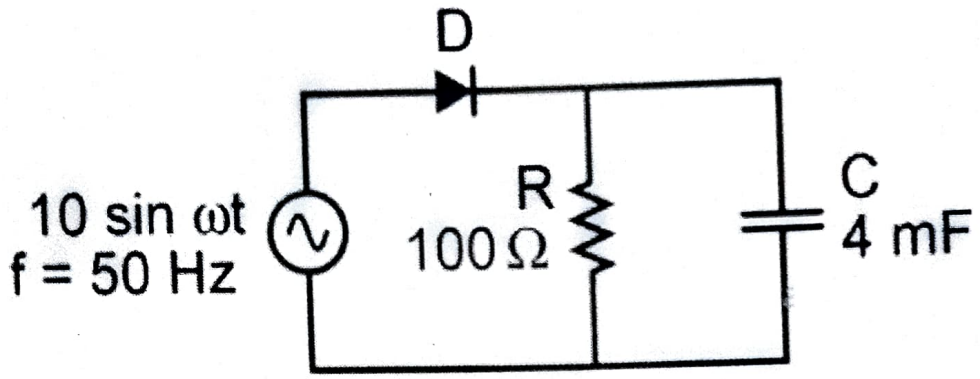
11) Assume that the diode in the figure has on Von = 0.7V, but is otherwise ideal.



The magnitude of the current i2 (in mA) is equal to _____.

Correct answer is 0.25

12) The figure shows a half-wave rectifier. The diode D is ideal. The average steady-state current (in Amperes) through the diode is approximately _____.



Correct answer is 0.1

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R15 B.TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

Course Code and Title :10211EC102/ANALOG ELECTRONICS

Course Coordinator : DR HARIKRISHNA PAIK

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section :		**Course Handling Faculty :** DR HARIKRISHNA PAIK		
1	VTU21752	G POORNA CHAITANYA	8.7	28
2	VTU23302	S PREETHIKA	8.8	25
3	VTU23626	K V S SUBRAHMANYESWARI	9.2	30
4	VTU23650	SURA RAKESH REDDY	8.9	29
5	VTU23741	YARRAGOLLA VENKATA SAI	8.9	29
6	VTU22808	CHILAKALA YASHWANTHI	8.8	30

Criteria for fast learners: CGPA greater than 8.5 and TEST1 greater than 24

Training / Activities Conducted for fast learners
1. Design of an diode clipper circuit
2. Design of an LF oscillator

Improvement/ Achievement of fast learners
1. students designed and simulated well

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : H		**Course Handling Faculty :** Dr. Ajisha M		
1.	VTU21368	EBENEZER R	9.67	29.5
2.	VTU21882	LEVIDI DEEPIKA	8.9	25
3.	VTU22084	PILLARAM NEHA REDDY	9.6	28
4.	VTU22176	KORUMILLI SAI SAMPATH	9.1	28

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Faculty Signature **Course Coordinator** **HOD/ ECE**

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R&D Institute of Science and Technology
Deemed to be University Estd. u/s 3 of UGC Act 1956

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Fast Learners– Action Taken Report

Course Code and Title : 10211EC102 & ANALOG ELECTRONICS

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	TEST III	End Semester Result
Section : H		**Course Handling Faculty :** Dr. Ajisha M			
1	VTU21368	EBENEZER R	29	30	A
2	VTU21882	LEVIDI DEEPIKA	23.5	29	A
3	VTU22084	PILLARAM NEHA REDDY	28.5	30	B
4	VTU22176	KORUMILLI SAI SAMPATH	26	30	B

Action Taken:

1. Gate Questions and materials were shared
2. Discussed about how to present each and every question in the CIA tests and university exam.

Faculty Signature **Course Coordinator** **HOD/ECE**

GATE Questions on Analog Electronics

1. A sample-and-hold (S/H) circuit, having a holding capacitor of 0.1 nF, is used at the input of an ADC (analog-to-digital converter). The conversion time of the ADC is 1μsec, and during this time, the capacitor should not lose more than 0.5% of the charge put across it during the sampling time. The maximum value of the input signal to the S/H circuit is 5V. The leakage current of the S/H circuit should be less than _____.

   a. 2.5 mA
   b. 0.25 mA
   c. 25.0 μA
   d. 2.5 μA

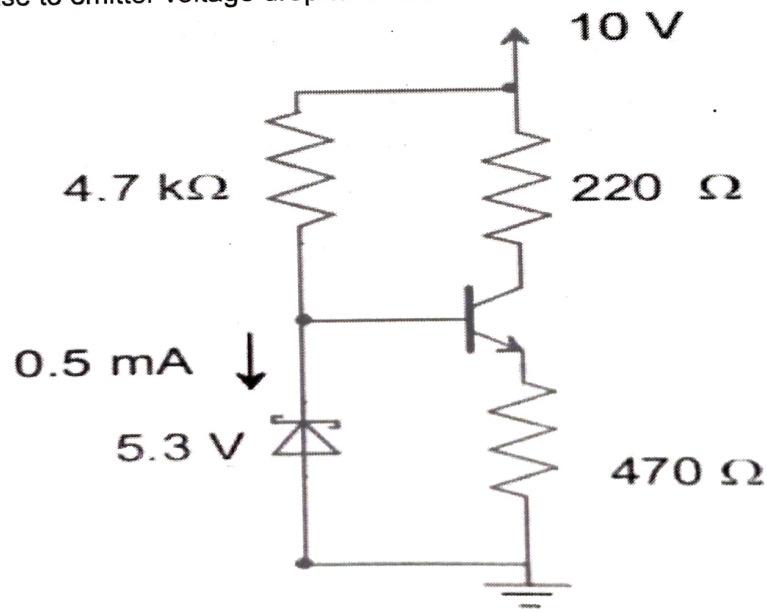
   Answer (d)

2. Which of the following is true in an RC- coupled common Emitter amplifier?

   a. Coupling capacitance affects the high frequency (hF) response, and bypass capacitance affects the low frequency (lF) response
   b. Both coupling and bypass capacitance affect the lF response
   c. Both coupling and bypass capacitance affects the hF response
   d. Coupling capacitance affects the lf response, and the bypass capacitance affects the hF response

   Answer (b)

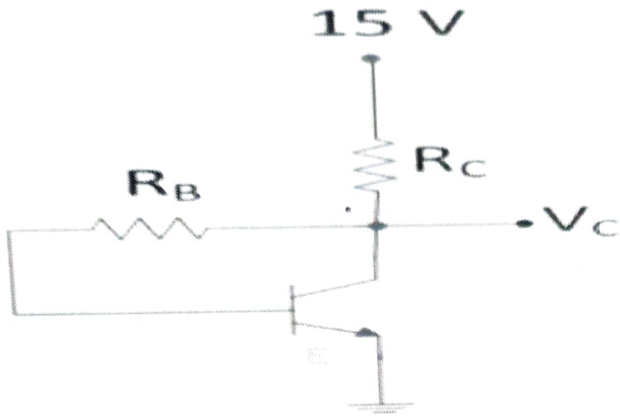
3. A transistor circuit is given below. The Zener diode breakdown voltage is 5.3 V as shown. Take base to emitter voltage drop to be 0.6 V. The value of the current gain β is _____.



   a. 1
   b. 0
   c. 11
   d. 19

   Answer (d)

4. In the given circuit, the silicon transistor has β =75 and a collector voltage VC=9V. Then the ratio of RB and RC is _____.



a. Between 0 and 100
b. Between 100 and 110
c. Between 0 and 1
d. None of the above

Answer (b)

5. When a bipolar junction transistor is operating in the saturation mode, which one of the following statements is TRUE about the state of its collector-base (CB) and the base-emitter (BE) junctions?
   a. The CB junction is forward biassed, and the BE junction is reverse biassed
   b. The CB junction is reverse biassed, and the BE junction is forward biassed
   c. Both CB and BE junctions are forward biassed
   d. Both CB and BE junctions are reverse biassed

Answer (c)

6. A bipolar junction transistor (BJT) is used as a power control switch by biassing it in the cutoff region (OFF state) or in the saturation region (ON state). In the ON state, for the BJT _____.
   a. Both the base-emitter and base-collector junctions are reverse biassed
   b. The base-emitter junctions are reverse biassed, and the base-collector junction is forward biassed
   c. The base-emitter junction is forward biassed, and the base-collector junction is reverse biassed
   d. Both the base-emitter and base-collector junctions are forward biassed

Answer (d)

7. One of the applications of the current mirror is _____.
   a. Output current limiting
   b. Obtaining a very high current gain
   c. Current feedback
   d. Temperature stabilised biassing

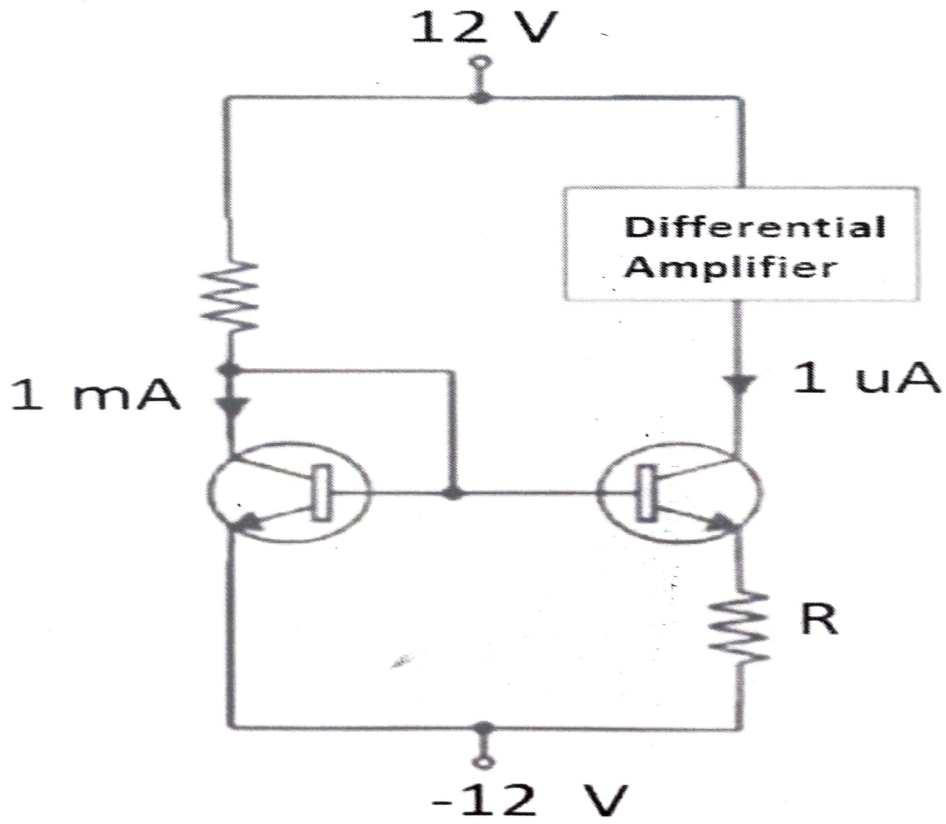
Answer (d)

8. The depletion region (or) space charge region (or) transition region in a semiconductor p-n junction diode has _____.

   a. Electrons and holes
   b. Positive ions and electrons
   c. Positive and negative ions
   d. Negative ions and holes

   Answer (c)

9. The circuit shown in the figure uses matched transistors with a thermal voltage V_T=25mV. The base currents of the transistors are negligible. The value of the resistance R in kΩ that is required to provide 1μA bias current for the differential amplifier block shown is _____.

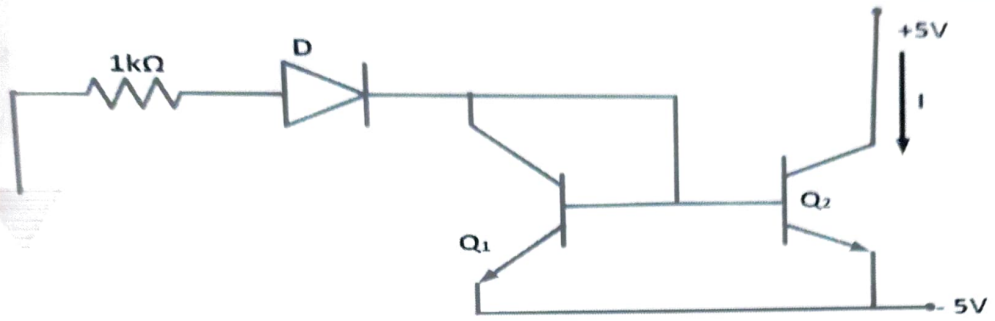


   a. 170 and 174
   b. 175 and 180
   c. 181 and 185
   d. 190 and 200

   Answer (a)

10. Two perfectly matched silicon transistors are connected as shown in the figure. Assuming the β of the transistors to be very high and forward voltage drop to be 0.7V, the value of

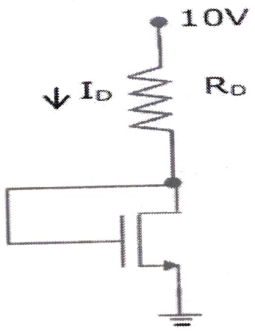
current I is (assume diode (D) is ideal) _____.



a. 0 mA
b. 3.6 mA
c. 4.3 mA
d. 5.7 mA

Answer (c)

11. For the n-channel enhancement MOSFET shown in the figure, the threshold voltage Vth=2V. The drain current ID of the MOSFET is 4 mA when the drain resistance RD is 1kΩ. If the value of RD is increased to 4Ω, drain current ID will become _____.



a. 2.8 mA
b. 2.0 mA
c. 1.4 mA
d. 1.0 mA

Answer (c)

12. An N-channel JFET having a pinch-off voltage (VP) of −5V shows a transconductance (gm) of 1 mA/V when the applied Gate to source voltage (VGS) is −3V. Its maximum transconductance (in mA/V) is _____.

a. 1.5
b. 2.0
c. 2.5
d. 3.0

Answer (c)

13. Of the four characteristics given below, which are the major requirements for an instrumentation amplifier?

P. High common mode rejection ratio

Q. High input impedance

R. High linearity

S. High output impedance

a. P, Q and R only
b. P and R only
c. P, Q and S only
d. Q, R and S only

Answer (a)

14. A low pass filter with a cutoff frequency of 30Hz is cascaded with a high pass filter with a cutoff frequency of 20Hz. The resultant system of filter coils function as _____.

a. All pass filter
b. An all-stop filter
c. A band stop filter
d. A Band pass filter

Answer (d)

15. The type of power amplifier which exhibits crossover distortion in its output is _____.

a. Class A
b. Class B
c. Class AB
d. Class C

Answer (b)

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/ Analog Electronics

Course Coordinator : Dr K.Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : J		Course Handling Faculty : Dr Ezhil E.Nithila		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.2	28.5

Criteria for fast learners: CGPA greater than 8.4 and Test 1 greater than 24

Faculty Signature

CC Signature

HOD Signature

Vel Tech
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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/ Analog Electronics

Course Coordinator : Dr K.Harikrishna Paik

S. No	VTU No.	Name of the Student	Performance of the student in CIA		
			Test II	Test III	End sem
Section : J		Course Handling Faculty : Dr Ezhil E.Nithila			
1	VTU21844	KAMABATHULA PAVAN TEJA	28.5	30	S

Action Taken

1. GATE questions and materials were shared.
2. Discussed about how to present each and every question in the CIA and university exam.

Faculty Signature **CC Signature** **HOD Signature**

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102 & Analog Electronics

Course Coordinator : Dr. Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		Course Handling Faculty : Dr.S.Vijayalakshmi		
1	VTU23397	CHITTEPU LINGESHWAR REDDY	9.4	26
2.	VTU23464	HEMANT SINGH	9.1	29
3.	VTU23631	BHAVESH RATHORE	8.8	30
4.	VTU23753	SACHIN KUMAR	8.5	27.5
5.	VTU23859	MUMMADI BHANU PRAKASH REDDY	8.2	25.5
6.	VTU23874	R J YESHMITAA	8.6	24
7.	VTU24296	THEERTHANA T	8.4	25.5

Training / Activities Conducted for fast learners

- Placement Oriented Activities conducted – Technical HR round Questions
- Advised them to participate in national level conference
- Guide them to publish papers in journals
- Mock Interviews

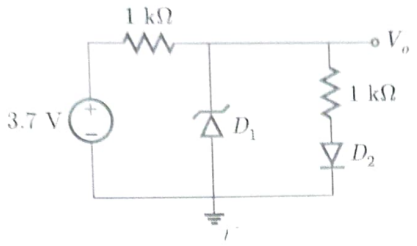
Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

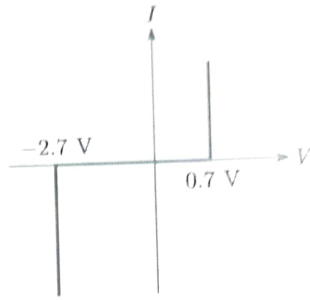
Improvement/ Achievement of fast learners

1. Topics are taught and discussed in line with GATE Exam and student standards were improvised.

Faculty Signature CC Signature HOD Signature

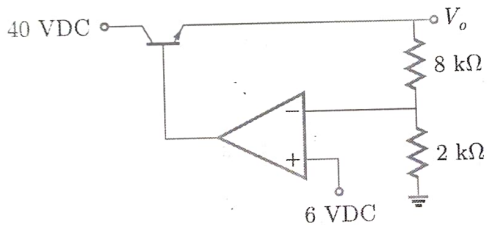
Assuming zener diode D_1 has current-voltage characteristics as shown below of the right and forward voltage drop of diode D_2 is 0.7 V, the voltage V_o in the circuit shown below is





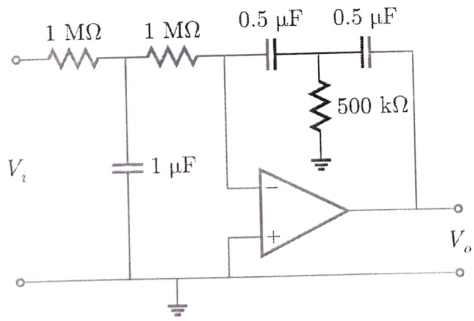
(A) 3.7 V
(B) 2.7 V
(C) 2.2 V
(D) 0 V

The value of V_o of the series regulator shown below is



(A) 24 V
(B) 28 V
(C) 30 V
(D) 32 V

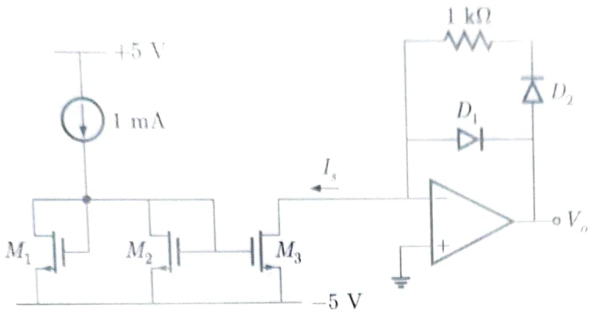
The ideal opamp based circuit shown below acts as a



(A) low-pass filter
(B) high-pass filter
(C) band-pass filter
(D) band-reject filter

Common Data For Questions 9 and 10 :

M_1, M_2 and M_3 in the circuit shown below are matched N-channel enhancement mode MOSFETs operating in saturation mode, forward voltage drop of each diode is 0.7 V, reverse leakage current of each diode is negligible and the opamp is ideal.



The current I_s in the circuit is

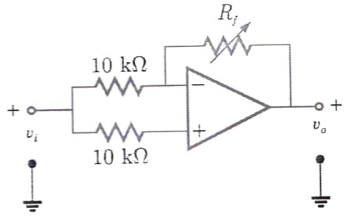
(A) -1 mA
(B) 0.5 mA
(C) 1 mA
(D) 2 mA

For the computed value of current I_s, the output voltage V_o is

(A) 1.2 V
(B) 0.7 V
(C) 0.2 V
(D) -0.7 V

YEAR 2010 ONE MARK

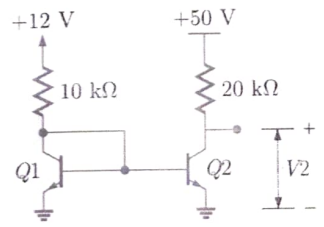
In the ideal op-amp circuit given in the adjoining figure, the value of R_f is varied from 1 $k\Omega$ to 100 $k\Omega$. The gain $G = \left(\frac{V_0}{V_i}\right)$ will



(A) remain constant at $+1$
(B) remain constant at -1
(C) vary as $(R_f/10,000)$
(D) vary as $(1 + R_f/10,000)$

YEAR 2010 TWO MARKS

The matched transistors $Q1$ and $Q2$ shown in the adjoining figure have $\beta = 100$. Assuming the base-emitter voltages to be 0.7 V, the collector-emitter voltage V_2 of the transistors $Q2$ is

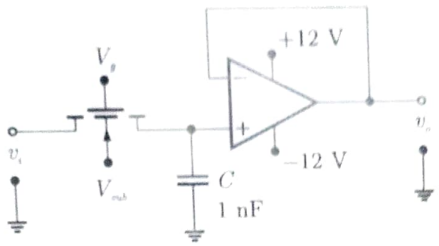


(A) 33.9 V
(B) 27.8 V
(C) 16.2 V
(D) 0.7 V

mywbut.com

Common Data For Questions 20 and 21 :

The figure shows a sample-and-hold circuit using a MOSFET as a switch. The threshold voltage of the MOSFET as a switch. The threshold voltage of the MOSFET is +2 V. It has zero leakage current in the off state. Assume that the capacitor is ideal.



The input voltage V_i ranges from −5 V to +5 V. Appropriate values of V_{sub}, of V_g during hold are, respectively,

(A) +12V ≥ + 7V and ≤ − 3V

(B) −12V, ≥ + 3V, and ≤ − 7V

(C) +12V, ≥ + 3V and ≤ − 7V

(D) −12V, ≥ + 7V, and ≤ − 3V

The circuit is used at a sampling rate of 1 kHz, with an A/D converter having a conversion time of 200 ms. The op-amp has an input bias current of 10 nA. The maximum hold error is

(A) 1 mV

(B) 2 mV

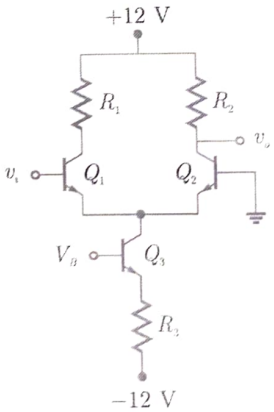
(C) 5 mV

(D) 10 mV

Common Data For Questions 22 and 23 :

The circuit shown in the figure uses three identical transistors with $V_{BE} = 0.7$ V and $\beta = 100$. Given $R_1 = R_2 = R_3 = 1\text{k}\Omega, \text{kT}/q_e = 25\text{mV}$

.The collector current of transistor Q_3 is 2 mA.



The bias Voltage V_B at the base of the transistor Q_3 is approximately

(A) −9.3 V

(B) −10.0 V

(C) −10.3 V

(D) −11.0 V

The small signal voltage gain of the circuit is

(A) −20

(B) −40

(C) 20

(D) 40

mywbut.com

ANSWER KEY

ANALOG ELECTRONICS									
1	2	3	4	5	6	7	8	9	10
(D)	(D)	(B)	(A)	(C)	(C)	(C)	(A)	(B)	(A)
11	12	13	14	15	16	17	18	19	20
(A)	(B)	(D)	(C)	(B)	(A)	(B)	(A)	(B)	(D)
21	22	23	24	25	26	27	28	29	30
(C)	(A)	(C)	(C)	(B)	(A)	(B)	(D)	(D)	(B)
31	32	33	34	35	36	37	38	39	40
(C)	(B)	(A)	(D)	(D)	(A)	(B)	(C)	(B)	(C)
41	42	43	44	45	46	47	48	49	50
(D)	(B)	(B)	(C)	(B)	(D)	(B)	(D)	(C)	(A)
51	52	53	54	55	56	57	58	59	60
(A)	(B)	(C)	(C)	(C)	(B)	(A)	(A)	(D)	(C)
61	62	63	64	65	66	67	68	69	70
(B)	(D)	(B)	(D)	(D)	(C)	(D)	(A)	(B)	(B)
71	72	73	74	75	76	77	78	79	80
(A)	(A)	(B)	(D)	(A)	(C)	(D)	(D)	(D)	(B)
81	82	83	84	85	86	87	88	89	90
(A)	(B)	(C)	(B)	(D)	(C)	(C)	(C)	(D)	(A)
91	92	93	94	95	96	97			
(A)	(C)	(B)	(B)	(B)	(D)	(A)			

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC102/Analog Electronics

Course Coordinator : Dr.Harikrishna Paik

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		**Course Handling Faculty :** Dr.N.Vinodhkumar		
1	VTU23332	KONATHAM BHAVANI SHANKAR REDDY	8.6	25.5
2	VTU24349	POOJA.U	8.7	26.5
3	VTU24454	HARIHARAN G	8.6	26.5
4	VTU21678	NAVINA SRI U	8.6	28
5	VTU22509	RISHIKA M N	8.9	30

Training / Activities Conducted for fast learners

- Encouraged students to take up competitive exams like GATE, GRE, TOEFL, IELTS, CAT, PGCET etc.
- Also discussed the opportunities to develop their technical and teamwork skills by involving in various events in IEEE and IETE student chapter and Department Clubs
- Advised them to participate in conferences

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Few students got benefitted from the discussion
- They participated in technical events.

Faculty Signature **CC Signature** **HOD Signature**

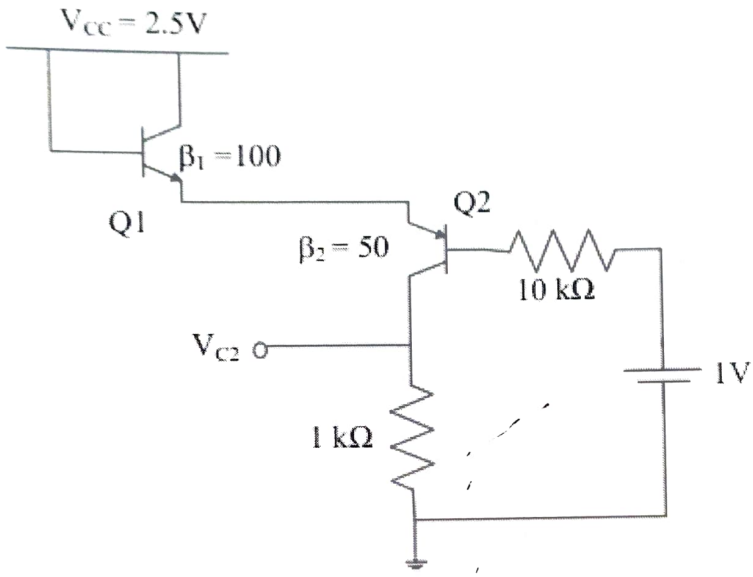
Analog Electronics

GATE questions for Fast Learners

Section J

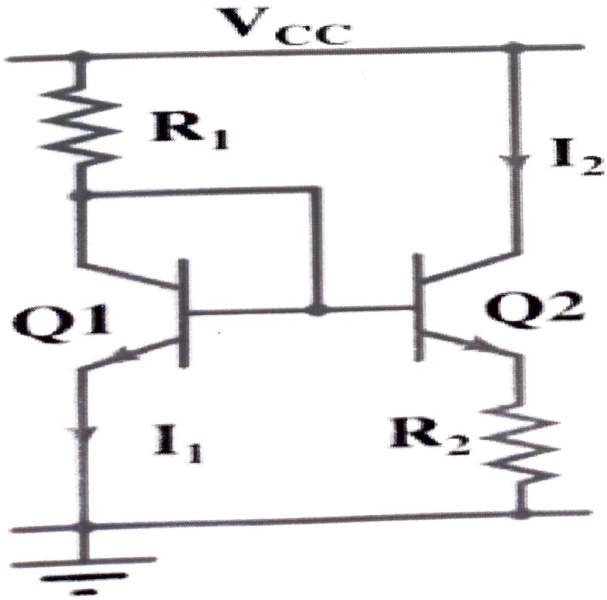
List of Questions:

1) Consider the circuit shown in the figure. Assuming VBE1 = VEB2 = 0.7 volt, value of the dc voltage Vc2 (in volt) is _____



Correct answer is 0.5

2) Resistor R1 in the circuit below has been adjusted so that I1 = 1 mA. The bipolar transistor Q1 and Q2 are perfectly matched and have very high current gain, so their base currents are negligible. The supply voltage Vcc is 6 V. The thermal voltage kT/q is 26 mV.



The value of R2 (in Ω) for which I2 = 100μA is _____.

Correct answer is 598.7

3) A common emitter transistor amplifier has a collector current of 1.0 mA when its base current is 25 μA at the room temperature. It's input resistance is approximately equal to (in KΩ) _____ .

Correct answer is 1

4) In order to reduce the harmonic distortion in an amplifier, its dynamic range has to be _____

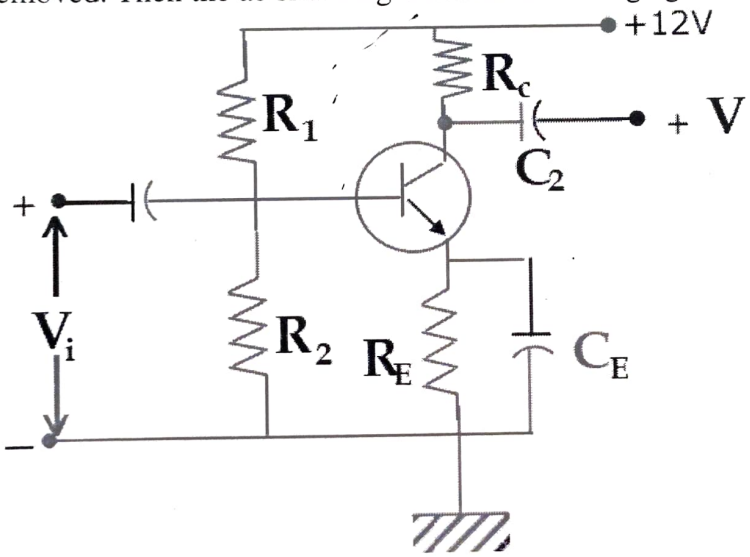
Correct answer is Compressed

5) For an ideal MOSFET biased in saturation, the magnitude of the small signal current gain for a common drain amplifier is

a) 0
b) 1
c) 100
d) Infinite

Correct answer isinfinite

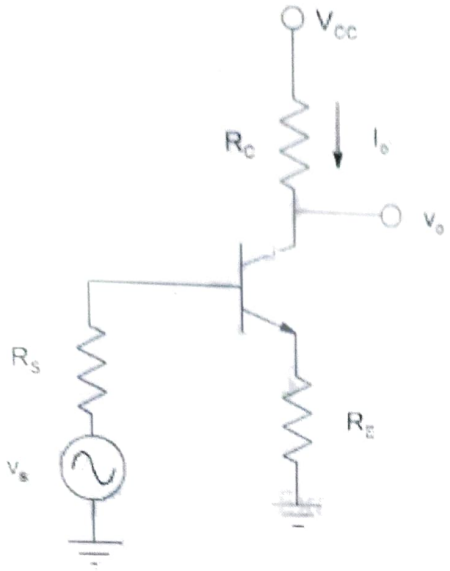
6) In the single stage transistor amplifier circuit shown in figure, the capacitorC_E is removed. Then the ac small signal midband voltage gain of the amplifier



a) Increases
b) Decreases
c) Is unaffected
d) Drops to zero

Correct answer isdecreases

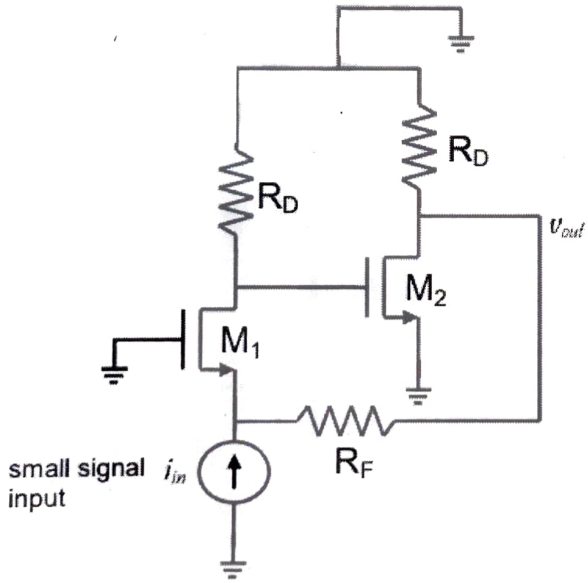
7) The feedback topology in the amplifier circuit (the base bias circuit is not shown for simplicity) in the figure is



a) Voltage shunt feedback
b) Current series feedback
c) Current shunt feedback
d) Voltage series feedback

Correct answer isCurrent series feedback

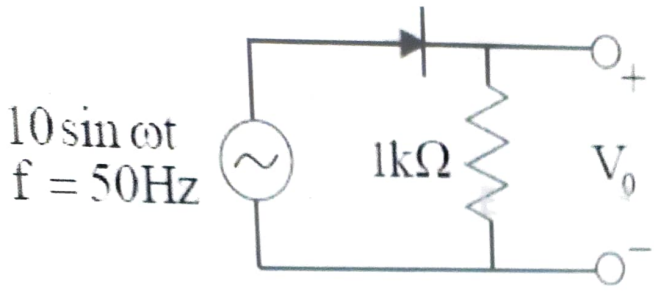
8) In the ac equivalent circuit shown in the figure, if i_F is very large, the type of feedback is



a) Voltage -Voltage feedback
b) Voltage- Current feedback
c) Current-Voltage feedback
d) Current-current feedback

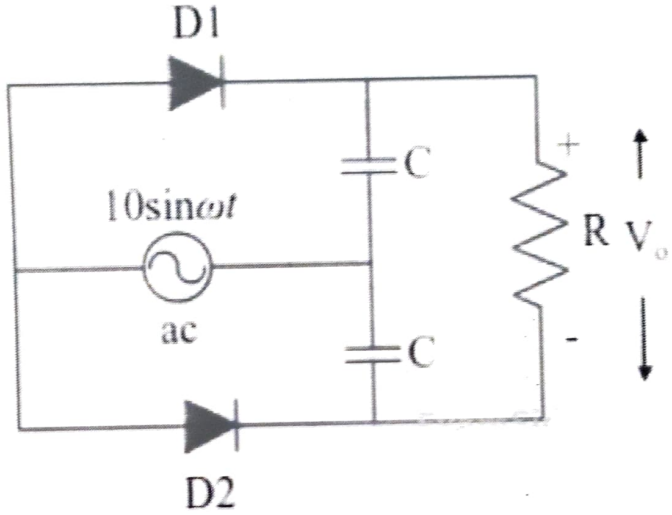
Correct answer is Voltage- Current feedback

9) The output V0 of the diode circuit shown in the figure is connected to an averaging DC voltmeter. The reading on the DC voltmeter in Volts, neglecting the voltage drop across the diode, is _____.



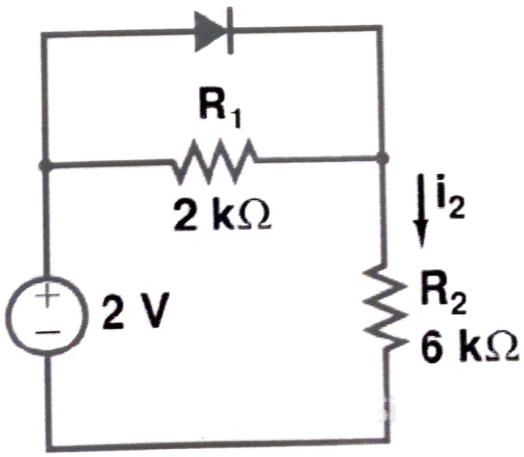
Correct answer is 3.18

10) The diodes D1 and D2 in the figure are ideal and the capacitors are identical. The product RC is very large compared to the time period of the ac voltage. Assuming that the diodes do not breakdown in the reverse bias, the output voltage V0 (in volt) at the steady state is_____.



Correct answer is 0

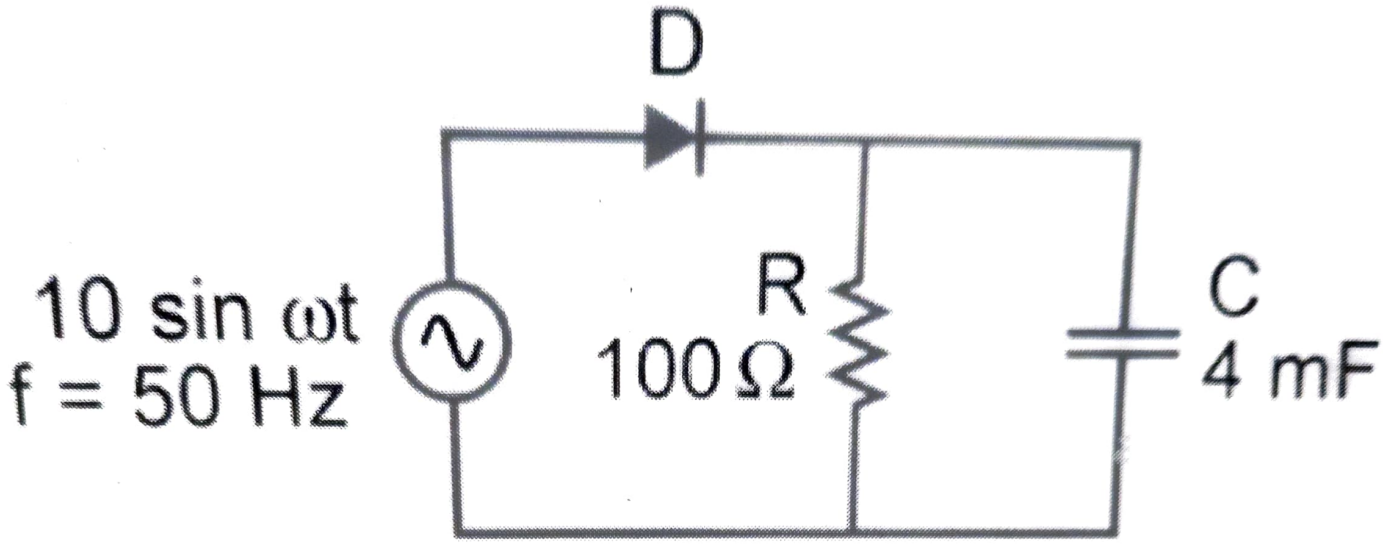
11) Assume that the diode in the figure has on Von = 0.7V, but is otherwise ideal.



The magnitude of the current i2 (in mA) is equal to _____.

Correct answer is 0.25

12) The figure shows a half-wave rectifier. The diode D is ideal. The average steady-state current (in Amperes) through the diode is approximately _____.



Correct answer is 0.1

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CATEGORY	Test I
Section : E		Course Handling Faculty : Dr. Debashish Pal.		
1	VTU21833	SONI KUMARI	A	27
2	VTU22176	KORUMILLI SAI SAMPATH	A	27
3	VTU22680	GANNAVARAPU ARUN KUMAR	A	26
4	VTU23798	D NEHARIKA	A	26

Training / Activities Conducted for fast learners

- Motivated to solve GATE questions on Digital Electronics.

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners

The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions.

Faculty Signature

CC Signature

HOD Signature

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SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTU R 2021

Summer Semester 2023 – 2024
B.Tech. – ECE
QUESTIONS FOR FAST LEARNERS

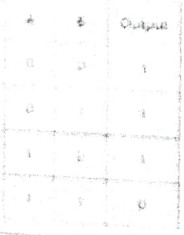
SECTION: E

Faculty Name: Dr. Debashish Pal
Course Category: Programme Core
Course Code/Course Title: 10211EC103/ Digital Electronics
Semester: Summer

Date: 30-10-2023

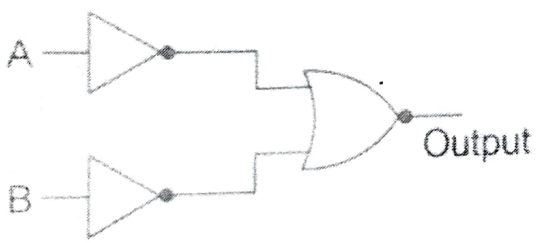
Answer any 5 questions with proper explanations.

Q. No.	Questions
1.	In the combination of the following gates the output Y can be written in terms of inputs A and B as  1. $\bar{A}\bar{B}$ 2. $A \cdot B + \bar{A} \cdot B$ 3. $\bar{A}+\bar{B}$ 4. $A \cdot \bar{B} + A \cdot B$ 5. None of the above
2.	The given electrical network is equivalent to  1. NOT gate 2. AND gate 3. OR gate 4. NOR gate 5. None of the above/More than one of the above.

3.	Choose the logic operation carried out by the following current :  1. OR Gate 2. AND Gate 3. NAND Gate 4. More than one of the above. 5. None of the above
4.	NAND gate combination is: 1. OR and NOT gate 2. NOT and NOR gate 3. NOT and AND gate 4. All of the above
5.	Identify the logic gate  1. AND gate 2. OR gate 3. NAND gate 4. NOR gate
6.	Identify the logic gate from the given truth table The truth table for two input logic gate is as given below 
7.	Identify the logic gate from the given truth table

Input		Output
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

8. Which logic gate is equivalent to these combinations of logic gates



9. When both the input signals A and B of the NOR & NAND gate are connected together, The output of the resultant circuit will be equivalent to

1. OR
2. AND
3. NOT
4. None of the above

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC103/Digital Electronics

Course Coordinator : Dr. G. Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		**Course Handling Faculty :** Dr.R.Remya		
1	VTU23874	YESMITAA R J	8.6	29

Training / Activities Conducted for fast learners

Motivated the students to participate in technical contests, Workshops, Solved Gate Problems to improve their academic performance.

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

Secured good marks in CIA tests and Surely will give their best in University Exam.

Faculty Signature **CC Signature** **HOD Signature**

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE 21 B.TECH – ECE

SUMMER 2023-24

FAST LEARNER ACTIVITY
GATE 2022 QUESTIONS

Course Handling Faculty: Dr.R.Remya TTS No: 3619

Course Code &Title: 10211EC103 & Digital Electronics Section: F

Course Category: Programme core

1. Select the Boolean function(s) equivalent to x + yz, where x, y, and z are Boolean variables, and + denotes logical OR operation.

   1. x + z + xy
   2. (x + y)(x + z)
   3. x + xy + yz
   4. x + xz + xy

2.

A function F(A, B, C) defined by three Boolean variables A, B and C when expressed as sum of products is given by

$$F = \overline{A}.B.\overline{C} + \overline{A}.B.C + A.B.\overline{C}$$

where, $\overline{A}$, $\overline{B}$, and $\overline{C}$ are the complements of the respective variables. The product of sums (POS) form of the function F is

A $F = (A + B + C)(A + \overline{B} + C)(\overline{A} + B + C)$

B $F = (\overline{A} + \overline{B} + \overline{C})(\overline{A} + B + \overline{C})(A + \overline{B} + \overline{C})$

C $F = (A + B + \overline{C})(A + \overline{B} + \overline{C})(\overline{A} + B + \overline{C})(\overline{A} + \overline{B} + C)(\overline{A} + \overline{B} + \overline{C})$

D $F = (\overline{A} + \overline{B} + C)(\overline{A} + B + C)(A + \overline{B} + C)(A + B + \overline{C})(A + B + C)$

3.

The Boolean expression (x + y)(x + bar y) + bar((x + y) + x) simplifies to

(A) X

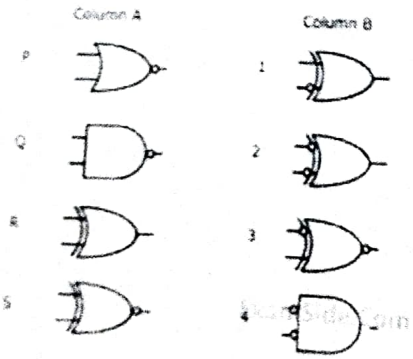
(B) Y

(C) XY

(D) X + Y

4.

Match the logic gates in column A with their equivalents in column B.



A P-2, Q-4, R-1, S-3

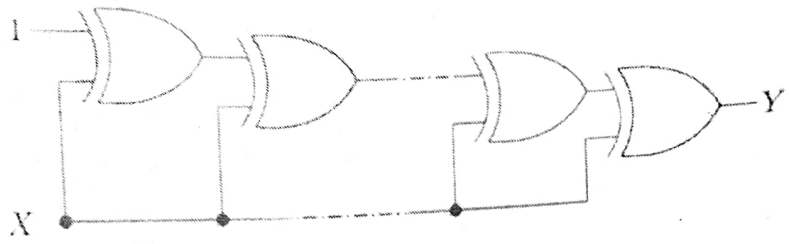
B P-4, Q-2, R-1, S-3

C P-2, Q-4, R-3, S-1

D, P-4, Q-2, R-3,S-1

5.

If the input to the digital circuit (in the figure) consisting of a cascade of 20 XOR-gates is X then the output Y is equal to



A 0

B 1

C $\overline{X}$

Faculty Sign

Course Coordinator

HOD ECE

NAME: Yeshmitaa.R.J

VTUNO: VTU 23874

GATE 2022

Select the Boolean function(s) equivalent to $x+yz$, where x, y, z are Boolean variable and + denotes logical OR operation

(A) $x + z + xy$

(B) $(x+y)(x+z)$

(C) $x+xy+yz$

(D) $x+xz+xy$

Ans: (B) $(x+y)(x+z)$ and (C) $x+xy+yz$

Explanation:

Given: $F = x+yz$

(A). $x+xy+xz = x(1+y)+xz = x+xz = x$

(B) $(x+y)(x+z) = x+yz$

(C) $x+xy+yz = x(1+y)+yz = x+yz$

(d) $xy+yz = y(x+z)$

∴ So option (b) & (c) are correct

2). A function $F(A, B, C)$ defined by 3 Boolean variable A, B and C when express as SOP is give by

$$F = \bar{A}.\bar{B}.\bar{C} + \bar{A}.B.\bar{C} + A.\bar{B}.\bar{C}$$

where $\bar{A}$, $\bar{B}$ and $\bar{C}$ are complements of the respective variables. The POS form of the function F is:

(A) $F: (A+B+C)(A+\bar{B}+C)(\bar{A}+B+C)$

(B) $F: (\bar{A}+\bar{B}+\bar{C})(\bar{A}+B+\bar{C})(A+\bar{B}\,\bar{C})$

(C) $F: (A+B+\bar{C})(A+\bar{B}+\bar{C})(\bar{A}+B+\bar{C})(\bar{A}+\bar{B}+C)(\bar{A}+\bar{B}+\bar{C})$

(d) $F: (\bar{A}+\bar{B}+C)(\bar{A}+B+C)(A+\bar{B}+C)(A+B+\bar{C})(A+B+C)$

Ans: (C) $F: (A+B+\bar{C})(A+\bar{B}\,\bar{C})(\bar{A}+B+\bar{C})(\bar{A}+\bar{B}+C)(\bar{A}+\bar{B}+\bar{C})$

Explanation:

$F(A,B,C) = \bar{A}.\bar{B}.\bar{C} + \bar{A}.B.\bar{C} + A.\bar{B}.\bar{C}$

$\bar{A}.\bar{B}.\bar{C} = 000 = 0$; $\bar{A}.B.\bar{C} = 010 = 2$

$A.\bar{B}.\bar{C} = 100 = 4$

So, $F(A,B,C) = \Sigma(0,2,4)$

Above expression is in SOP Form

∴ Pos Form is

$F(A,B,C) = \Pi(1,3,5,6,7)$

$= \Pi(001, 011, 101, 110, 111)$

In Pos form:

001 = $(A+B+\bar{C})$

011 = $(A+\bar{B}+\bar{C})$

101 = $(\bar{A}+B+\bar{C})$

110 = $(\bar{A}+\bar{B}+C)$

111 = $(\bar{A}+\bar{B}+\bar{C})$

∴ F(A,B,C) in Pos form

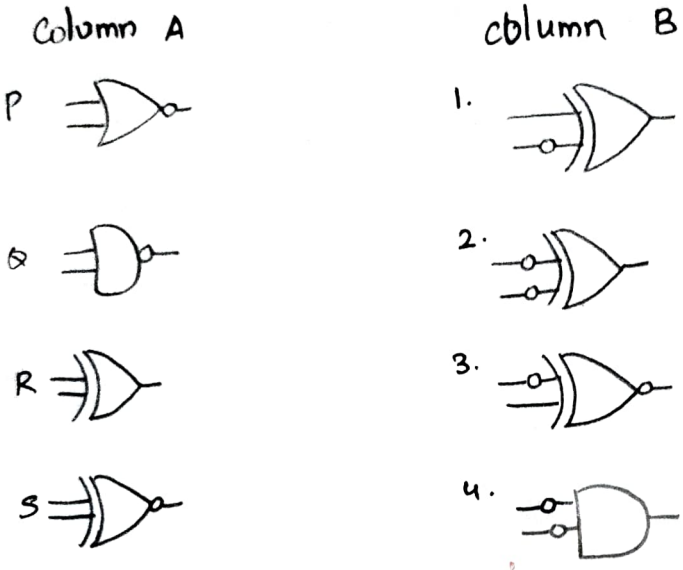
$= (A+B+\bar{C})(A+\bar{B}+\bar{C})(\bar{A}+B+\bar{C})(\bar{A}+\bar{B}+C)(\bar{A}+\bar{B}+\bar{C})$

The Boolean expression $(x+y)(x+\bar{y})+\overline{(x\bar{y})+\bar{x}}$

(A) x (B) y (C) x y (D) x+y

Ans: (A) x

4) Match the logic Gates In column A with their equivalent

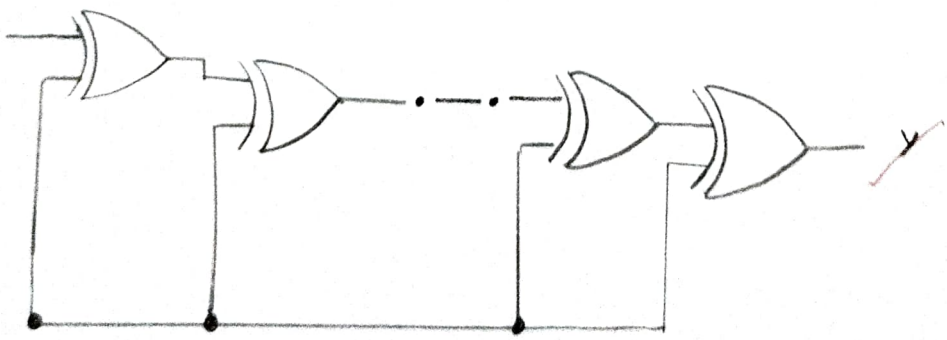


(A) P-2, Q-4, R-1, S-3 (B) P-4, Q-2, R-1, S-3

(C) P-2, Q-4, R-3, S-1 (D) P-4, Q-2, R-3, S-1

Answer: (D) P-4, Q-2, R-3, S-1

5). If the Input to the digital circuit consisting of a cascade of 20 xor-Gates is X then the output Y is equal to



(A) 0 (B) 1 (C) $\overline{X}$ (D) X

Ans: (B) 1

3

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024
FAST LEARNERS LIST

Course Code and Title : 1021EC103/Digital Electronics

Course Coordinator: Dr.G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		**Course Handling Faculty : M.R.Ezilarasan**		
1	VTU22443	KAPA RAKESH REDDY	8.7	27
2	VTU23416	M CHARAN	9	24
3	VTU23448	BODDU SAGAR	8.9	24.5
4	VTU23628	PEDDI PRATHUSHA	9.7	28
5	VTU23668	KORRAKUTI PENCHALA LAKSHMI NARASIMHA	9.2	27
6	VTU23698	KANTA BHAVANA	8.7	24
7	VTU23726	MATHALA PRASANTH KUMAR	9.3	28

Training / Activities Conducted for fast learners

Gate questions were given for them as assignments and they solved the same and submitted

Improvement/ Achievement of fast learners

- Good problem-solving practice.
- Helping slow learners during group activities.

Faculty Signature **CC Signature** **HOD Signature**

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R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

ASSIGNMENT 1

Course Code : 10211EC103

Course Name : DIGITAL ELECTRONICS

Course Handling Faculty : Mr. Ezilarasan M R

Gate Questions

DIGITAL ELECTRONICS



Submitted By

M CHARAN

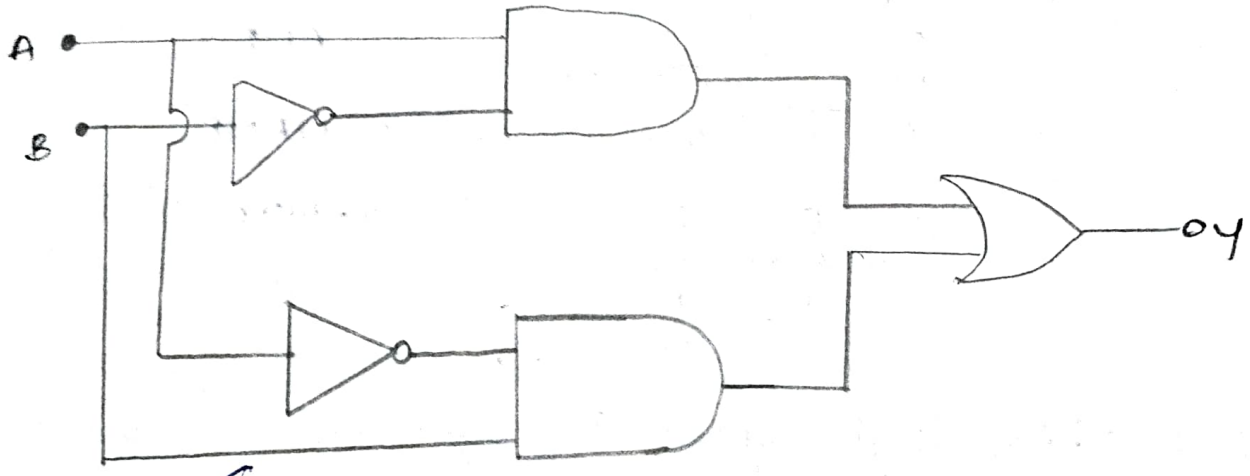
VTU23416

GATE Questions on Digital Electronics:

1. The minimum number of 2-input NAND gates required to implement a 2-input XOR gate is.

a) 4 ✓ b) 5 c) 6 d 7

2. In the combination of the following gate the output y can be written in terms of inputs A & B as.



1. $\overline{A} \cdot \overline{B}$ (2) $A \cdot \overline{B} + \overline{A} \cdot B$ 3. $\overline{A} + \overline{B}$ 4. $A \cdot \overline{B} + A \cdot B$

3. The given electrical network is equivalent to



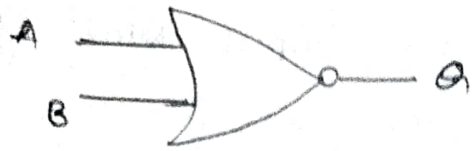
1. NOT gate 2. AND gate 3. OR gate 4. NOR gate ✓

4. NAND gate combination is:

1. OR and NOT gate. 3. ✓ NOT and AND gate

2. NOT and NOR gate 4. All the above

5. Identify the logic gate



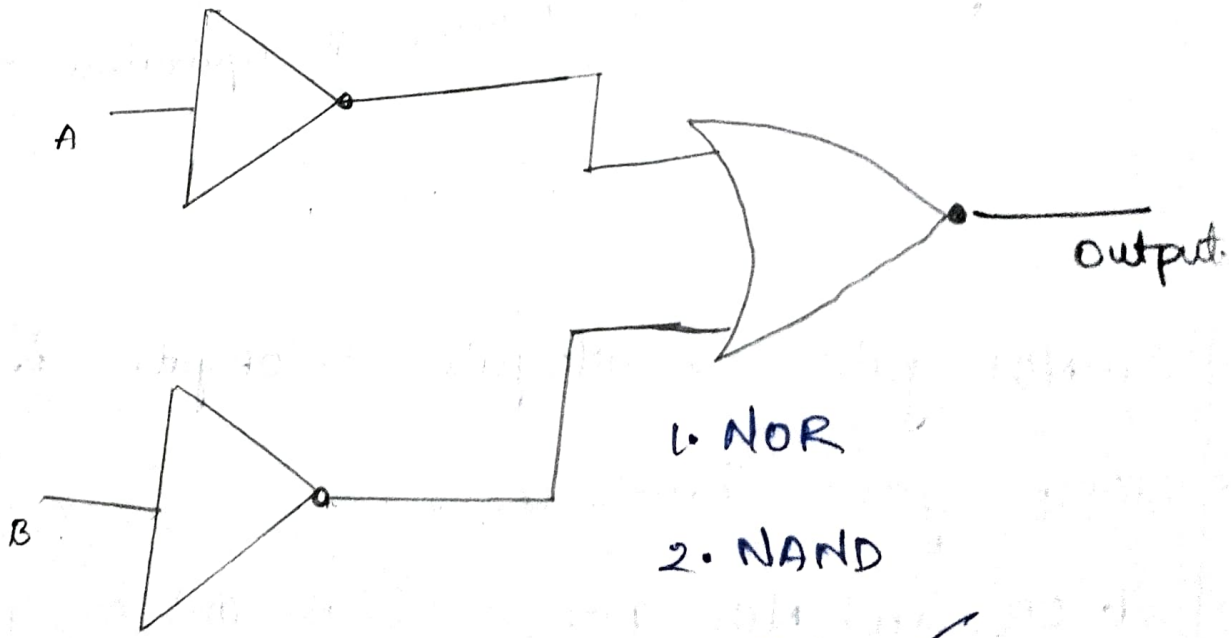
1. AND gate 2. OR gate 3. NAND gate 4. NOR g

6. Which logic gate will produce the following output

I/P		O/P
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

1. OR
2. AND
3. NAND
4. NOR

7. Which logic gate is equivalent to these combinatio of logic gates.



1. NOR
2. NAND
3. AND
4. OR

* The number of comparators required in a 3-bit comparator type ADC is

(a) 2 (b) 3 (c) 7 (d) 8

* The number of comparators in a 4-bit flash ADC is.

(a) 4 (b) 5 (c) 15 (d) 16.

* For an n-variable Boolean function maximum numbe of prime implicants is

A) $2(n-1)$ B) $n/2$ c) 2^n d) $2^{(n-1)}$

* The Boolean expression $(x+y)(x+\bar{y})+(\overline{(x\bar{y})+\bar{x}})$ simplifies to,

A) x B) y c) xy d) $x+y$

* Select the Boolean functions equivalent to $x+yz$, where x, y, and z are Boolean variables, and + denote logical OR operation.

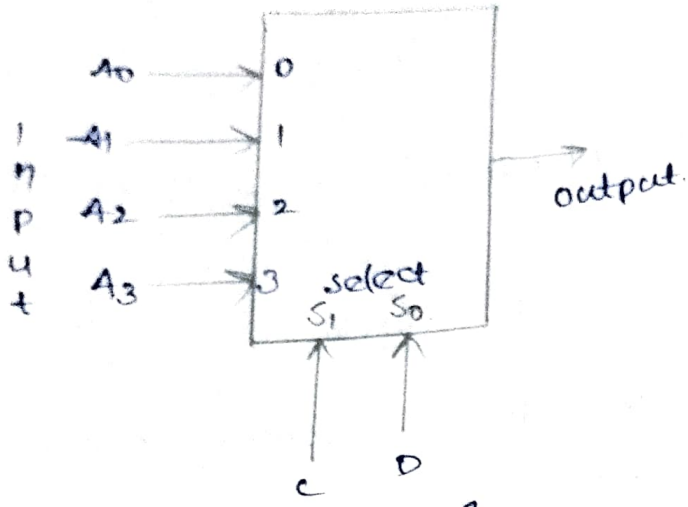
A) $x+z+xy$ B) $(x+y)(x+z)$ c) $x+xy+yz$

d) $x+xz+xy$

* Consider the 2-bit multiplexer. (MUX) shown in the figure. for output to be the XOR of c and D, the values for A_0, A_1, A_2 and A_3 are ——

A) $A_0=0, A_1=0, A_2=1, A_3=1$ (c) $A_0=0, A_1=1, A_2=1, A_3=0$

B) $A_0=1, A_1=0, A_2=1, A_3=0$ (d) $A_0=1, A_1=1, A_2=0, A_3=$



The output of MUX, F is.

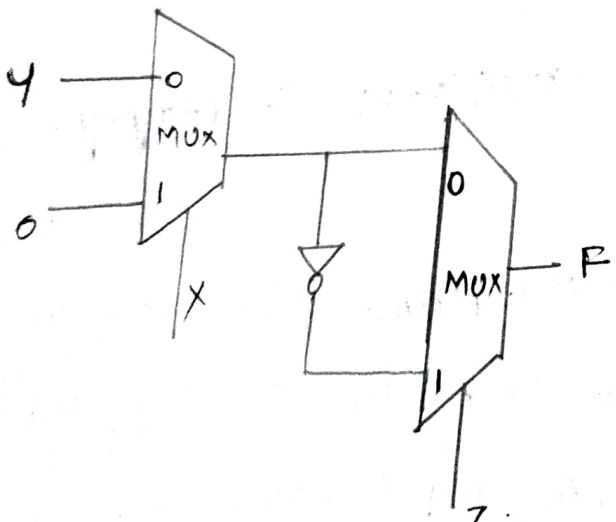
$$F = \bar{S_1}\bar{S_0}I_0 + \bar{S_1}S_0I_1 + S_1\bar{S_0}I_2 + S_1S_0I_3$$

$$F = \bar{C}\bar{D}A_0 + \bar{C}DA_1 + C\bar{D}A_2 + CDA_3.$$

But Output, $F = C \oplus D = \bar{C}D + C\bar{D}$

$\therefore$ Input of MUX are $A_0 = 0$, $A_1 = 1$, $A_2 = 1$, $A_3 = 0$

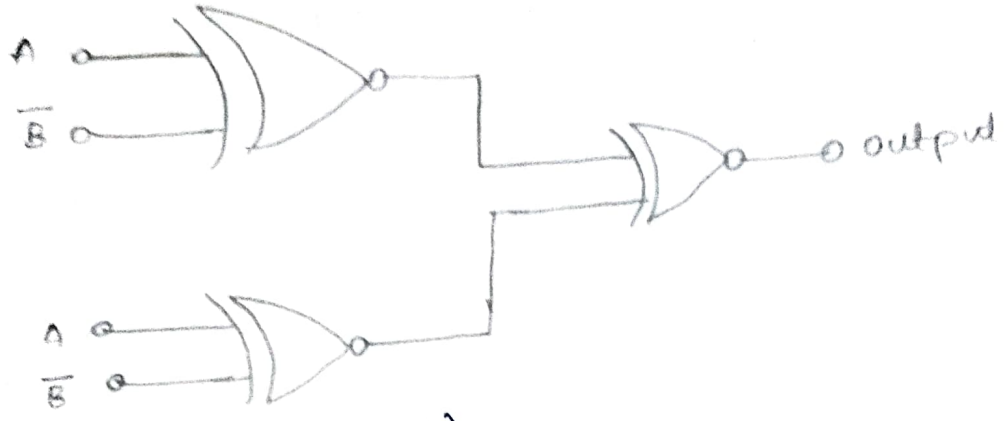
* Consider the circuit shown in figure.



Boolean Expression F implemented by the circuit is

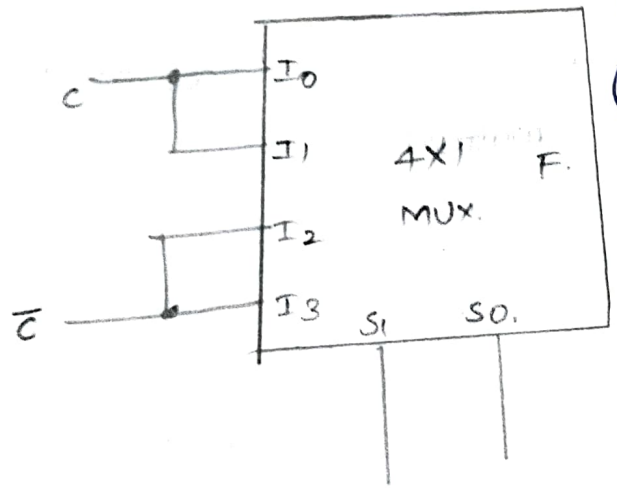
$$\bar{X}Y\bar{Z} + XZ + \bar{Y}Z$$

* The Output of the circuit shown in figure is equal to



$(\overline{A \oplus B}) \oplus (\overline{A \oplus B})$

* The logic realized by the circuit shown in figure is.



(A) $F = A \odot C$

(B) $F = A \oplus C$.

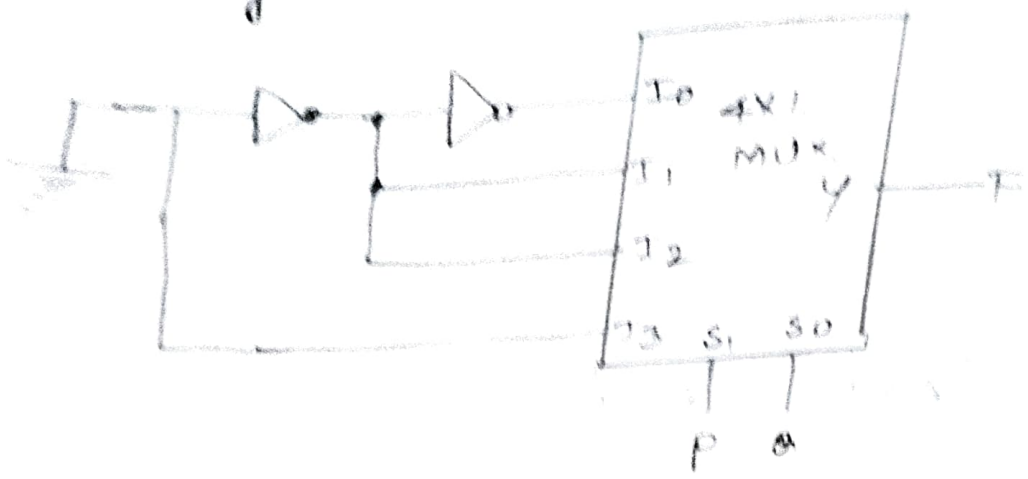
(C) $F = B \odot C$

(D) $F = B \oplus C$.

* The minimum function that can detect a "divisible by 3" 8421 BCD code digit (representation is $D_8\ D_4\ D_2\ D_1$) is given by:

$\Rightarrow D_8 D_1 + D_4 D_2 \overline{D_1} + \overline{D_4} D_2 D_1 + D_8 D_4 D_2$

* The logic function implemented by the circuit below is (ground implies a logic "0"):



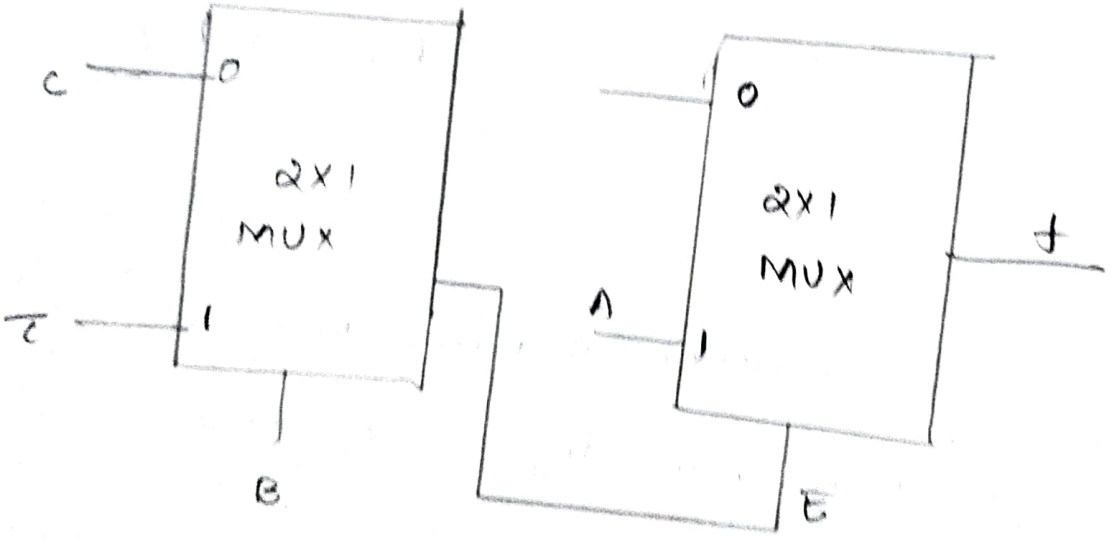
A) F = AND (P, Q)

C) F = XNOR (P, Q)

B) F = OR (P, Q)

D) F = XOR (P, Q) ✓

* The Boolean function f implemented in the figure using two input multiplexers is



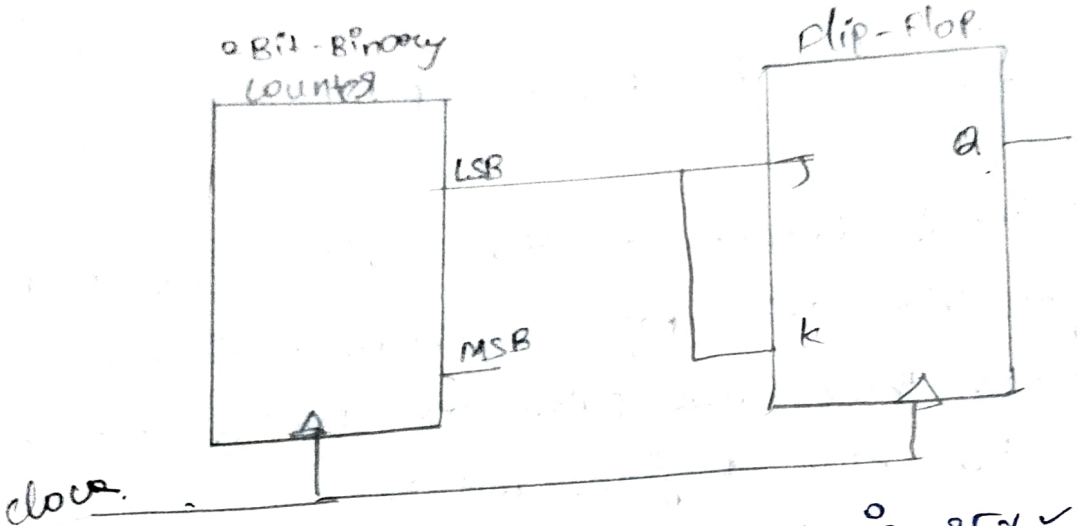
(A) $A\bar{B}C + AB\bar{C}$ ✓

(C) $\bar{A}BC + \bar{A}B\bar{C}$

(B) $ABC + AB\bar{C}$

(D) $\bar{A}BC + \bar{A}B\bar{C}$

* for the circuit shown, the clock frequency is fo and the duty cycle is 25% for the signal at the Q Output of the Flip-Flop —



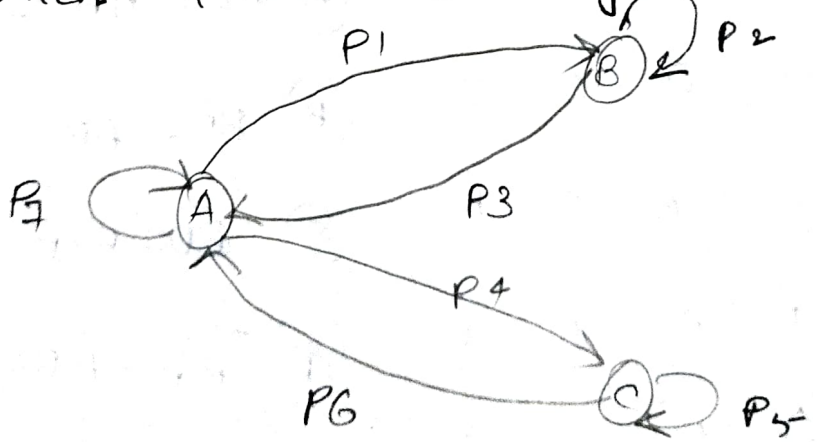
A) frequency is fo/4 and duty cycle is 25%. ✓

B) frequency is fo/4 and duty cycle is 25%.

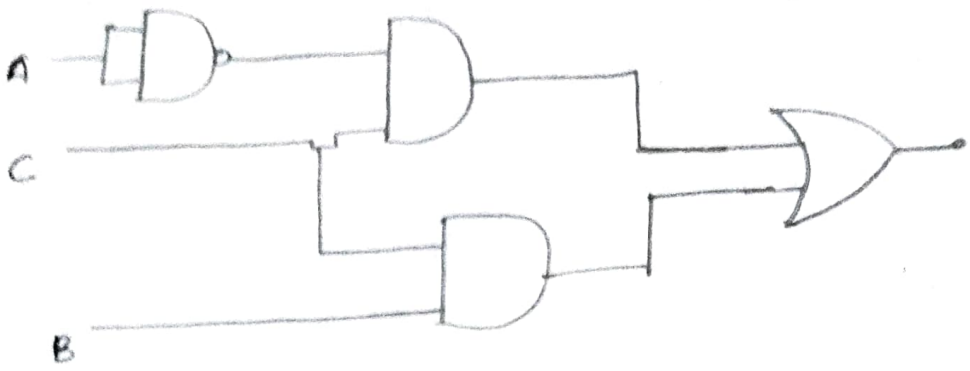
c) frequency if fo/2 and duty cycle is 50%.

d) frequency if fo and duty cycle is 25%.

* A state transition diagram with states A, B, and C and transition probabilities $P_1, P_2 \ldots\ldots P_7$, shown in the For this state diagram, select the statements which is/ are universally true.



(D)



* The Sop (sum of products) from a Boolean functi is $\Sigma(0,1,3,7,11)$, where inputs are A, B, C, D, (A is MSB, and D is LSB). The equivalent minimized Expressio of the function is.

(A) $(\bar{B}+C)(\bar{A}+C)(\bar{A}+\bar{B})(\bar{C}+D)$ ✓

(B) $(\bar{B}+C)(\bar{A}+C)(\bar{A}+\bar{C})(\bar{C}+D)$

(C) $(\bar{B}+C)(\bar{A}+C)(\bar{A}+\bar{C})(\bar{C}+\bar{D})$

(D) $(\bar{B}+C)(A+\bar{B})(\bar{A}+\bar{B})(\bar{C}+D)$

* Minimized form of function F is.

x \ yz	00	01	11	10
0	1	1	1	0
1	0	0	1	0

A) $F = \overline{xy} + yz$ ✓

B) $F = \overline{xy} + yz$

(C) $F = \overline{xy} + y\bar{z}$

(D) $F = \overline{xy} + \bar{y}z$

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC301 / Digital Electronics

Course Coordinator : Dr.G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		**Course Handling Faculty :** Dr.Mary Christeena Thomas		
1	23741	VENKATA SAI	9.0	29
2	21752	POORNA CHAITANYA	8.9	29
3	23626	SUBRAMANYESWARI K	9.0	27
4	23099	DINESH KUMAR	8.8	28

Training / Activities Conducted for fast learners

- Motivated to prepare for Gate exam also shared Gate questions .

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Performances of the students were good.

Faculty Signature **CC Signature** **HOD Signature**

Gate solutions

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Digital electronics

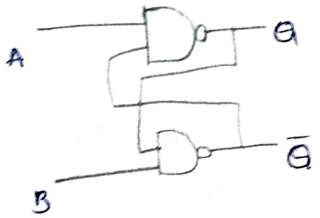
1. An equivalent 9's complement representation of the 9's complement number 1101: [Gate - 1998]

A) Step 1: 1101 → 0010 is complement

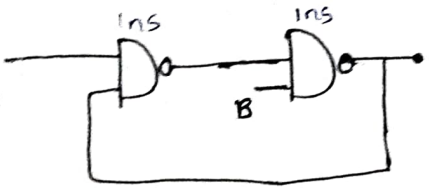
Step 2: Add 1 to the inverted number

$$\begin{array}{r} 0010 \\ +1 \\ \hline 0011 \end{array}$$

2. For the circuit show below. the propagation delay of each NAND gate is 1ns. the critical path, in ns is [Gate 2023]



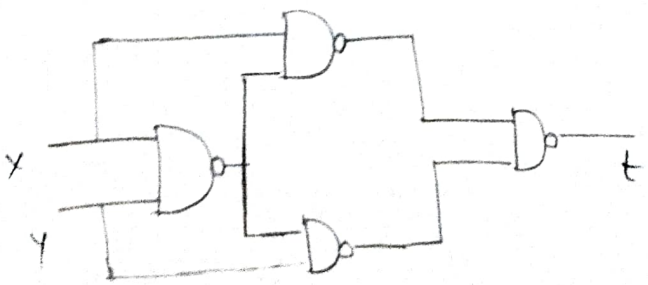
A)



The critical path delay = 1ns + 1ns = 2ns

3. The minimum number of 2-input NAND gates required to implement 2-input XOR gate is [2016 - set 3]

A)



4. A bulb in a staircase has two switches being at the ground floor and the other one of the first floor. The bulb can be turned on and also can tuned OFF by one of the switch irrespective of state of other switch. The logic of switching of the bulb resembles.

A. Truth Table XOR gate.

AB	Y
00	0
01	1
10	1
11	0

So, from the XOR gate truth table it is clear that the bulb can be turned and OFF by anyone of the switch es irrespective of the state of the other switch.

5. The No. of product terms in the minimized sum-of product Expression through the following K-map is.

1	0	0	1
0	d	0	0
0	0	d	1
1	0	0	1

= 2.

Digital Electronics

GATE CSE 2022

Function $F(A, B, C)$ defined by three boolean variables A, B and C when expressed as sum of products is given by

$F = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C}$

where $\bar{A}\bar{B}$ and $\bar{C}$ are complements of the respective variables

The product of sums (pos) form of function F is

Explanation

Given that

$F(A, B, C) = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C}$

$\bar{A}\bar{B}\bar{C} = 000 = 0$

$\bar{A}B\bar{C} = 010 = 2$

$A\bar{B}\bar{C} = 100 = 4$

so $F(A, B, C) = \Sigma(0, 2, 4)$

Above expression is in sop form

pos form is

$F(A, B, C) = \Pi(1, 3, 5, 6, 7)$

$= \Pi(001, 011, 101, 110, 111)$

In pos form

$001 = (A + B + \bar{C})$

$011 = (A + \bar{B} + \bar{C})$

$101 = (A + B + \bar{C})$

$110 = (\bar{A} + \bar{B} + C)$

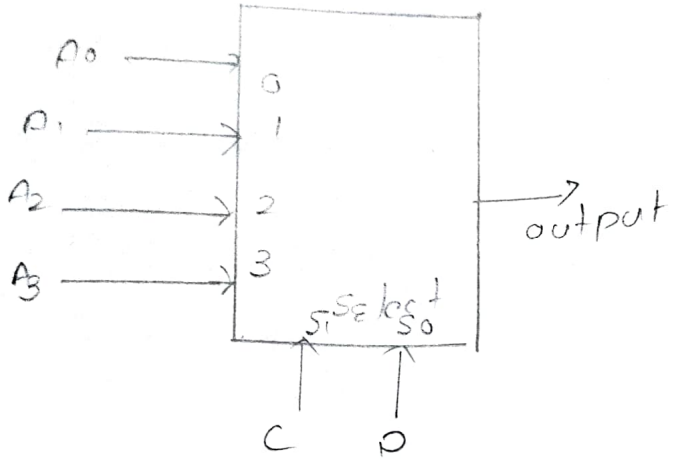
$111 = (\bar{A} + \bar{B} + \bar{C})$

$F(A, B, C)$ in pos form

$= (A + B + \bar{C})(A + \bar{B} + \bar{C})(\bar{A} + B + \bar{C}) + (\bar{A} + \bar{B} + C)(\bar{A} + \bar{B} + \bar{C})$

Gate - ECE - 2022

2 Consider the 2 bit multiplexer (mux) shown in the figure for output to be the XOR of C and D the values for A_0 A_1 A_2 and A_3 are



Explanation

The output of MUX, F is

$$F = \bar{S_1}\bar{S_0}I_0 + \bar{S_1}S_0I_1 + S_1\bar{S_0}I_2 + S_1S_0I_3$$

$$F = \bar{C}\bar{D}A_0 + \bar{C}DA_1 + C\bar{D}A_2 + CDA_3$$

But output $F = C \oplus D = \bar{C}D + C\bar{D}$

Input of mux are $A_0 = 0$ $A_1 = 1$ $A_2 = 1$ $A_3 = 0$

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VTU No:- 22859

Digital Electronics

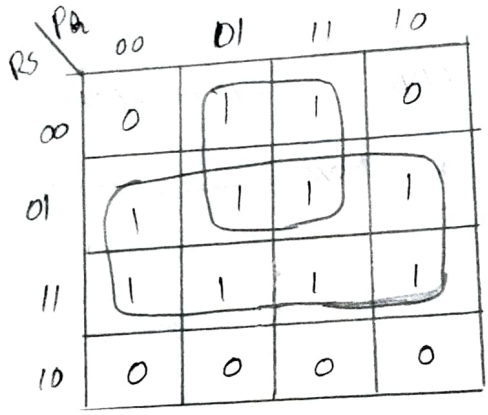
* The output expression for the karnaugh map shown below is [EE, 2019:- 2 Marks]

a) $QR + S$

b) $Q\bar{R} + S$

c) $Q\bar{R} + \bar{S}$

d) $QR + \bar{S}$



$K = \bar{P}Q(\bar{R}\bar{S} + \bar{R}S) + PQ(\bar{R}\bar{S} + \bar{R}S) + \bar{R}S + R\bar{S}$

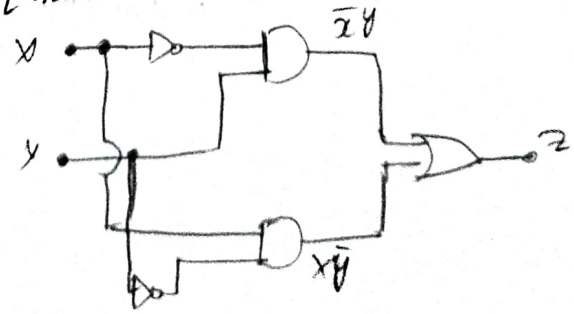
$= \bar{P}Q\bar{R} + PQ\bar{R} + RS + R\bar{S}$

$= Q\bar{R} + S$

∴ Expression for the karnaugh map is $Q\bar{R} +$

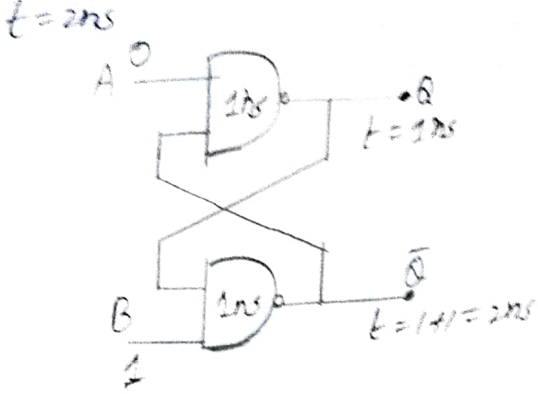
* In the circuit shown below, x and y are digital inputs and z is a digital output. The equivalent circuit is [EE, 2019:- 2 Marks]

∴ The equivalent circuit is XOR gate



* For the circuit shown below, the propagation delay of each NAND gate is 1ns. The critical path delay, in ns is _____. [Gate 2023, EE, Mark]

Ans



* A MOD 2 and a MOD 5 up-counter when cascaded together results in a MOD _____ counter. [GATE 2022, EE 1 mark]

Ans- 2×5 = 10 counters.

* The maximum clock frequency in MHz of a 4-stage ripple counter, utilizing flipflops, with each flip-flop having a propagation delay of 20 ns, is 12.5MHz. [GATE 2022, EE 1 Mark].

Sol-

$$(f_{clk})_{MAX} = \frac{1}{n\, t_{FF}}$$

$$t_{FF} = 20ns$$

$$\frac{1}{4 \times 20ns} = \frac{10^3}{80}$$

$$= \frac{1000}{80} \times 10^6$$

$$= 12.5\ MHz$$

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VTU 23193
Dept: ECE
Sub: Digital Electronics
Faculty: Dr. Mary christeena thomas

Gate questions on Digital Electronics:

1. The minimum number of 2-input NAND gates, required to implement a 2-input XOR gate is

(GATE ECE 2016 set 3)

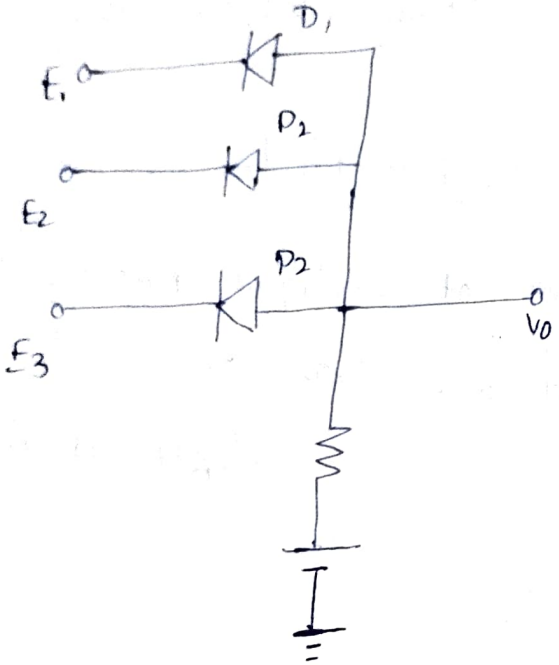
(a) 4
(b) 5
(c) 6
(d) 7

Solution:- The number of 2-input NAND gates required to implement a 2-input XOR gate is 4. Similarly, the number of 2-input NOR gates Required to implement a 2-input XNOR gate is 4.

(a) 4

2. In the circuit shown, diodes are ideal, and inputs F_0 and are "0 v" for logic '0' and '10v' for logic '1'. what logic gate does circuit represent?

(Gate ECE 2015 Set 3)



(a) 3-input OR gate

(b) 3-input NOR gate

(c) 3-input AND gate

(d) 3-input XOR gate.

Solution:- (c) 3-input AND gate

3. In a DRAM, what we can do? Gate ECE 2017 Set 2

(a) Periodic refreshing is not required

(b) Information is stored in a capacitor

(c) Information is stored in a latch

(d) Both read and write operation can be Performed

Solution:-

DRAM uses capacitor to store information.

(b) Information is stored in capacitor

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC103 and Digital Electronics

Course Coordinator : Dr G Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		**Course Handling Faculty : Dr D Preethi**		
1	VTU21678	NAVINA SRI U	9.1	28
2	VTU21789	RAVELLA JAGADISH	8.6	28
3	VTU22323	POLURU HARIKA	8.6	29
4	VTU22509	RISHIKA M N	9.6	29
5	VTU23464	HEMANT SINGH	9.1	28
6	VTU23498	POTHALA VEERA NAGA SAI	8.6	24
7	VTU23552	MUMMADI MADHURIMA	8.6	29
8	VTU24240	PUTTHA NAGA SRUTHI	8.8	30

Training / Activities Conducted for fast learners

- Motivated to students to participate in Smart India Hackathon/other technical events
- Presented Technical Seminar on Recent Advancementsin Digital Electronics

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners

The knowledge gained in the participation of events will help the students in building confidence and grooming their personal skills.

Preethi. D
Faculty Signature

CC Signature

HOD Signature

VTU No.

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL & COMMUNICATION
DEPARTMENT OF ECE

VTU R 2021

GATE QUESTIONS FOR FAST LEARNERS

B.Tech. – ECE

Course Category: Programme Core
Course Code/Course Title:1021EC103/Digital Electronics
Semester: Odd Semester (2023-24)

Section: G
Max.Marks: 20
Date of Submission:26.10.2023

S.No.	Answer all the Questions	Marks	Course Outcome	Level
1	In 16-bit 2's complement representation, the decimal number -28 is: **[Gate 2019]** (A) 1000 0000 1110 0100 (B) 0000 0000 1110 0100 (C) 1111 1111 1110 0100 (D) 1111 1111 0001 1100 **Solution:** Correct answer is (C)	2	CO1	K2
2	Which one of the following is NOT a valid identity? **[Gate 2019]** (A) $(x \oplus y) \oplus z = x \oplus (y \oplus z)$ (B) $(x + y) \oplus z = x \oplus (y + z)$ (C) $x \oplus y = x + y$, if $xy = 0$ (D) $x \oplus y = (xy + x'y')'$ **Solution:** Correct answer is (B)	2	CO1	K2
3	The minters expansion of f(P, Q, R) = PQ + QR' + P'R'	2	CO2	K2

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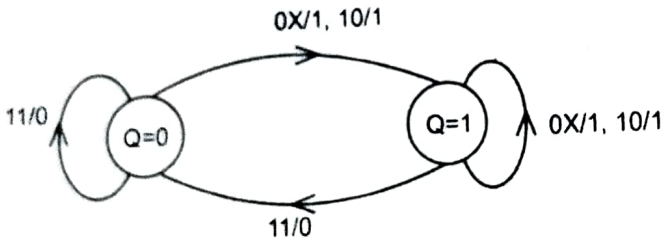
DEPARTMENT OF ECE

VTU R 2021

	is **[Gate 2020]** (A) m2 + m4 + m6 + m7 (B) m0 + m1 + m3 + m5 (C) m0 + m1 + m6 + m7 (D) m2 + m3 + m4 + m5 **Solution:** Correct answer is (A)			
4	The maximum clock frequency in MHz of a 4-stage ripple counter, utilizing flip-flops, with each flip-flop having a propagation delay of 20 ns, is _____. (round off to one decimal place). **[Gate 2023]** Answer Correct answer is 12.5 Explanation Given ripple counter 4 flip-flop, tp = 20 nsec for each flip-flop. $T = nt_p = 4 \times 20$ nsec = 80 nsec Clock frequency $= \frac{1}{T} = \frac{1}{4 \times 20 \times 10^{-9}} = 12.5$ MHz	2	CO2	K2
5	3. Consider a 4-bit Johnson counter with an initial value of 0000. The counting sequence of this counter is **[Gate 2023]** (A) 0, 1, 3, 7, 15, 14, 12, 8, 0 (B) 0, 1, 3, 5, 7, 9, 11, 13, 15, 0 (C) 0, 2, 4, 6, 8, 10, 12, 14, 0 (D) 0, 8, 12, 14, 15, 7, 3, 1, 0	2	CO3	K2

CC

HOD

	Solution: Correct answer is (D)			
6	A MOD-2 and a MOD-5 up-counter when cascaded together results in a MOD _____ counter. (in integer). **[Gate 2021]** Answer Correct answer is 10 Explanation For overall configuration = Mod (2 x 5) = 10	2	CO3	K2
7	A state diagram of a logic gate which exhibits a delay in the output is shown in the figure, where X is the don't care condition, and Q is the output representing the state.  The logic gate represented by the state diagram is (A) AND (B) NOT (C) OR (D) NAND **Solution:** Correct answer is (D)	2	CO4	K2
8	A cascade of three identical modulo -5 counters has an over all modulus of (A) 5 (B) 125	2	CO4	K2

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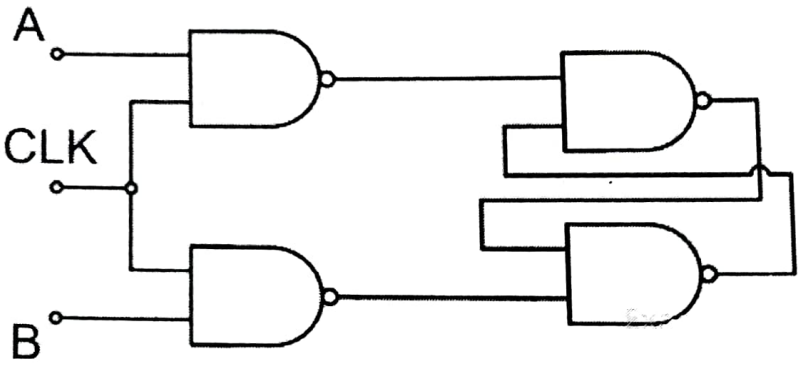
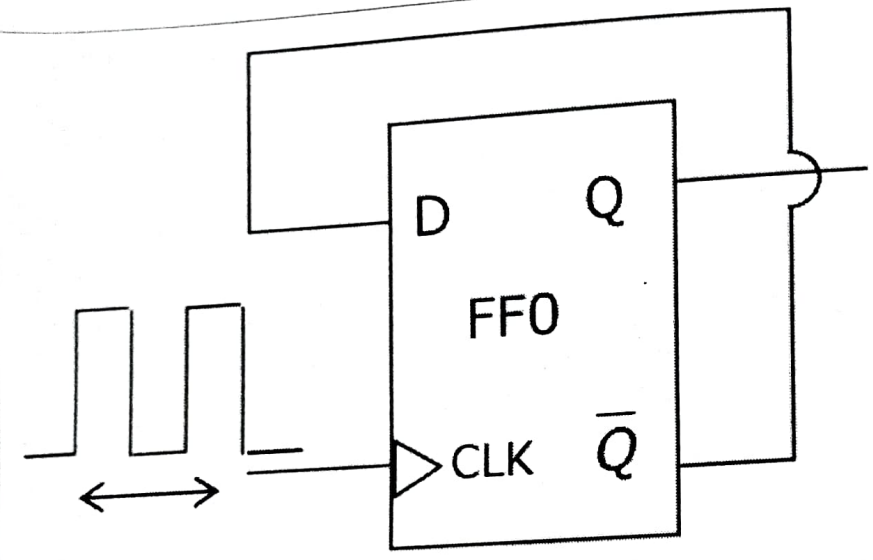
DEPARTMENT OF ECE

VTU R 2021

	(C) 60 (D) 85 **Solution:** Correct answer is (B)			
9	Consider the given circuit. In this circuit, the race around  (A) does not occur (B) when CLK=0 (C) when CLK=1 and A=1, B=1 (D) when CLK=1 and A=1, B=0 **Solution:** Correct answer is (A)	2	CO5	K2
10	The frequency of the clock signal applied to the rising edge triggered flip-flop shown in Fig. is 10kHz. The frequency of the signal available at Q is	2	CO5	K2



(A) 5kHz

(B) 50 kHz

(C) 25kHz

(D) 2.5kHz

Solution: Correct answer is (A)

Digital Electronics

Gate Questions

Name : Navira Sri.U

VTU NO : VTU21678

Department : ECE

1) In 16 bit 2's complement representation, the decimal number -28 is

a) 1000 0000 1110 0100

b) 0000 0000 1110 0100

c) 1111 1111 1110 0100

d) 1111 1111 0001 1100

2) which one of the following is NOT a valid identity?

a) $[x \oplus y] \oplus z = x \oplus (y \oplus z)$

b) $[x + y] \oplus z = x \oplus (y + z)$

c) $x \oplus y = x + y$, if $xy = 0$

d) $x \oplus y = (xy + x'y')$

3) The minterm expansion of $f(P, Q, R) = PQ + QR' + P'R'$ is

a) $m_2 + m_4 + m_6 + m_7$

b) $m_0 + m_1 + m_3 + m_5$

c) $m_0 + m_1 + m_6 + m_7$

d) $m_2 + m_3 + m_4 + m_5$

4) The maximum clock frequency in MHz of a 4 - Stage ripple Counter, utilize flipflop with each flipflop having a propagation delay of 20 ns is (round off to one decimal place).

Answer : 12.5

Explanation

$T = ntp = 4 \times 20\,msec = 80\,nsec$

Clock frequency $= \frac{1}{T} = \frac{1}{4 \times 20 \times 10^{-9}} = 12.5\,MHz$

5. Consider a 4 bit Johnson Counter when Cascaded together with an initial Value of 0000. The Counter sequence of this is

a) 0, 1, 3, 7, 15, 14, 12, 8, 0

b) 0, 1, 3, 5, 7, 9, 11, 13, 15, 0

c) 0, 2, 4, 6, 8, 10, 12, 14, 0

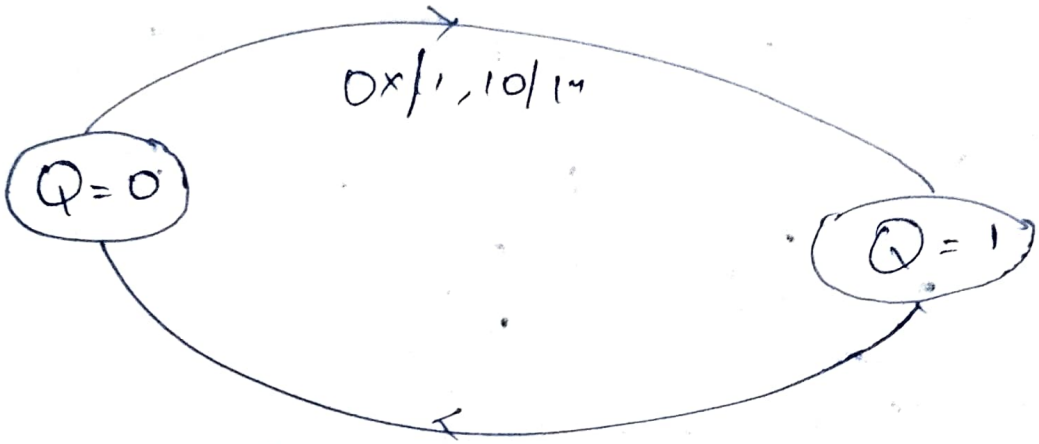
d) 0, 8, 12, 14, 15, 7, 3, 1, 0

6. A mod-2 and mod-5 up Counter when Cascaded together results in MOD Counter (in integer)

Answer : 10

For overall Configuration : $mod(2 \times 5) = 10$.

7. A State diagram of logic gate which exhibits a delay in the Output is shown, where x is the don't care and Q is output representing the state.



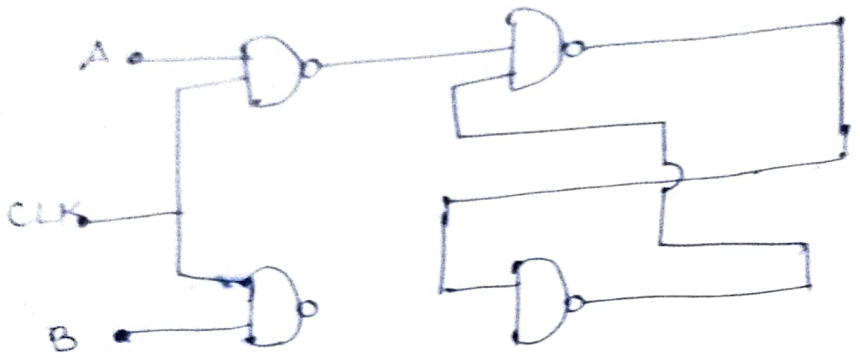
The logic gate represented by State diagram is

a) AND
b) NOT
c) OR
d) NAND

8. A Cascade of three identical modulo-5 Counters has an overall modulus of

a) 5
b) 125
c) 60
d) 85

9) Consider the Circuit, the race around the Circuit



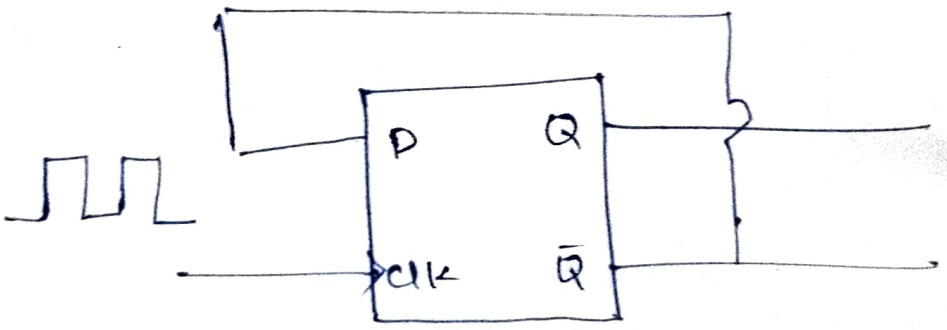
a) It does not occur

b) when clk = 0

c) when clk = 1 and A = 1, B = 1

d) when clk = 1 and A = 1, B = 0

10) The frequency of clock signal applied to the rising edge triggered flipflop shown fig is 10KHz. The frequency of the signal available at Q is



a) 5kHz

b) 50KHz

c) 25kHz

d) 2.5kHz

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC103 & Digital Electronics

Course Coordinator : Dr. G. Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : I		**Course Handling Faculty :** Dr. J. Arun Kumar		
1	VTU23304	SANGAMSUSHMA	8.6	26.5
2	VTU22144	YERRAM REDDY VIGNESWAR REDDY	9.0	25.5
3	VTU23472	JOGU VARA PRASAD	9.3	28.5

Training / Activities Conducted for fast learners

- Motivated to prepare for Gate exam, and also shared Gate questions.

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Performances of the students were good.

Faculty Signature **CC Signature** **HOD Signature**

FACULTY NAME: DR. J. ARUN KUMAR

19. The output Y of a 2-bit comparator is logic 1 whenever the 2-bit input A is greater than the 2-bit input-B. The number of combinations for which the output is logic 1, is

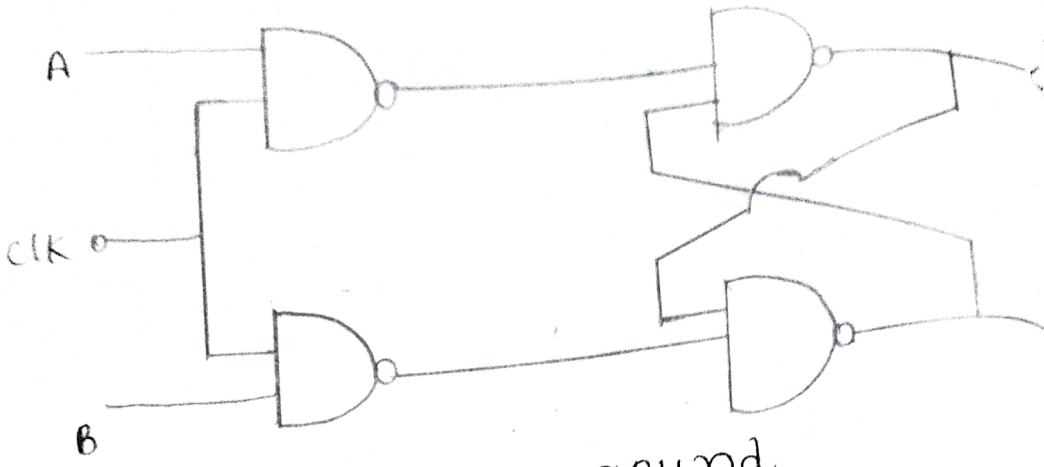
a. 4 b. 6 c. 8 d. 10

Answer : B (6)

Input A		Input B		
A_2	A_1	B_2	B_1	
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

Thus for 6 combinations output in logic 1

20. consider the given circuit



In this circuit, the race ground

a. does not occur

b. occurs when clk = 0

c. occurs when clk = 1 and A = B = 1

d. occurs when clk = 1 and A = B = 0

Answer: A

$$Q_{next} = \overline{\overline{A \cdot clk \cdot \bar{Q}}}$$

$$= A \cdot clk + Q$$

$$\bar{Q}_{next} = A \cdot clk + \bar{Q}$$

If clk = 1, and A and B = 1

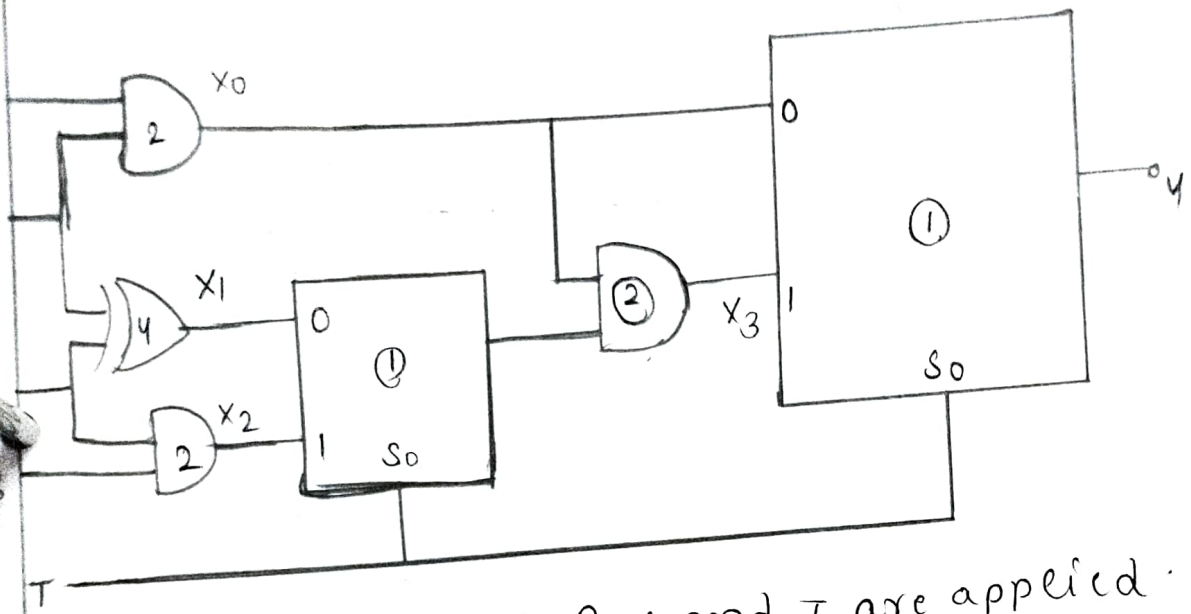
$$\left.\begin{aligned} Q_{next} &= 1 \\ \bar{Q}_{next} &= 1 \end{aligned}\right\} \text{no race around.}$$

If clk = 1 and A = B = 0

$$\left.\begin{aligned} Q_{next} &= Q \\ \bar{Q}_{next} &= \bar{Q} \end{aligned}\right\} \text{no race around}$$

Thus race around does not occur in the circuit

The propagation delays of XOR gate, AND gate and multiplexer (MUX) in circuit shown in the figure are 4ns, 2ns, 1ns respectively.



If all the inputs P, Q, R, S and T are applied simultaneously and held constant, maximum propagation delay of circuit is:

A. 3ns B. 6ns C. 5ns D. 7ns.

Answer: B (6ns)

when T=0, to get output only signal x_0, is essential for second MUX, so delay involved in this case is 2n sec for x_0, MUX delay 1 nsec, total

2+1 = 3sec

T=1, to get output y we need x_2 and $x_3 \cdot x_2$ will be available at 2nsec (delay of AND gate)

F will be available for after 1 n-sec of x_2 2+1 = 3nsec.

x_3 will available after 2 nsec of F 3+2 = 5nsec

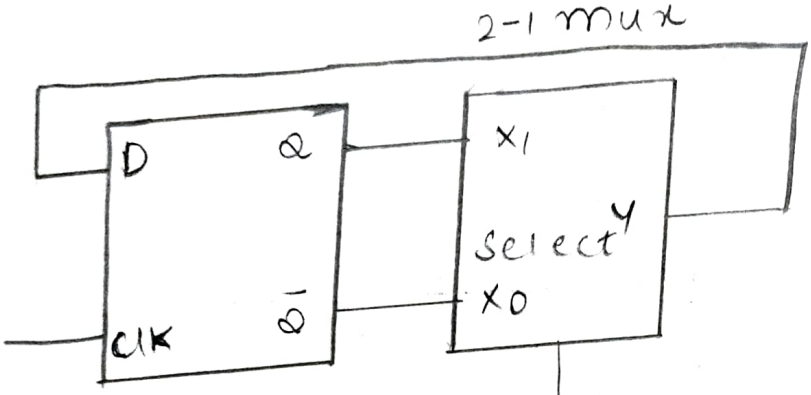
y will be avaiable after 1 nsec of x_3 is set

T=0, we get y at 3nsec

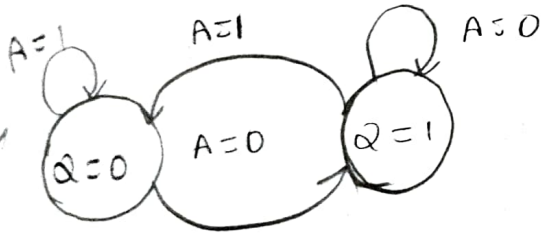
T=1, we get y at 6nsec

worst case delay is 6nsec

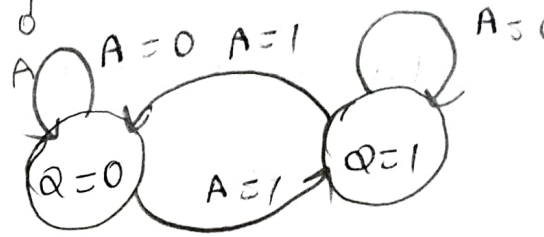
30. state transition diagram for logic circuit shown is.



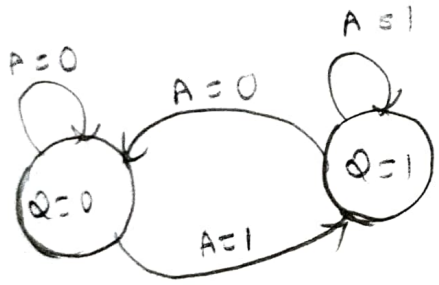
A ✓



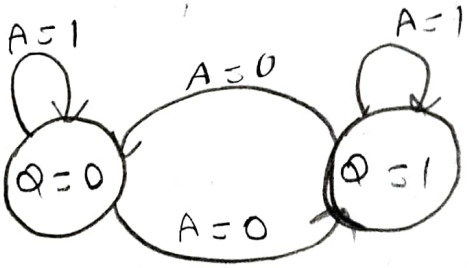
B.



C



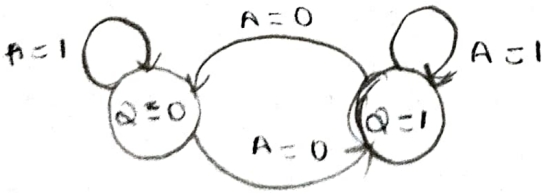
D.



Answer : D

A=0, $y=Q$ whenever A=1, Output gets

A=1, $y=\bar{Q}$ into same state.



whenever A=0, output gets toggled.

Addressing of a 32K x 16 memory is realized using a single decoder. The minimum number of AND gates required for decoder is.

a. 2^8 b. 2^{19} c. 2^{15} d. 2^{32}

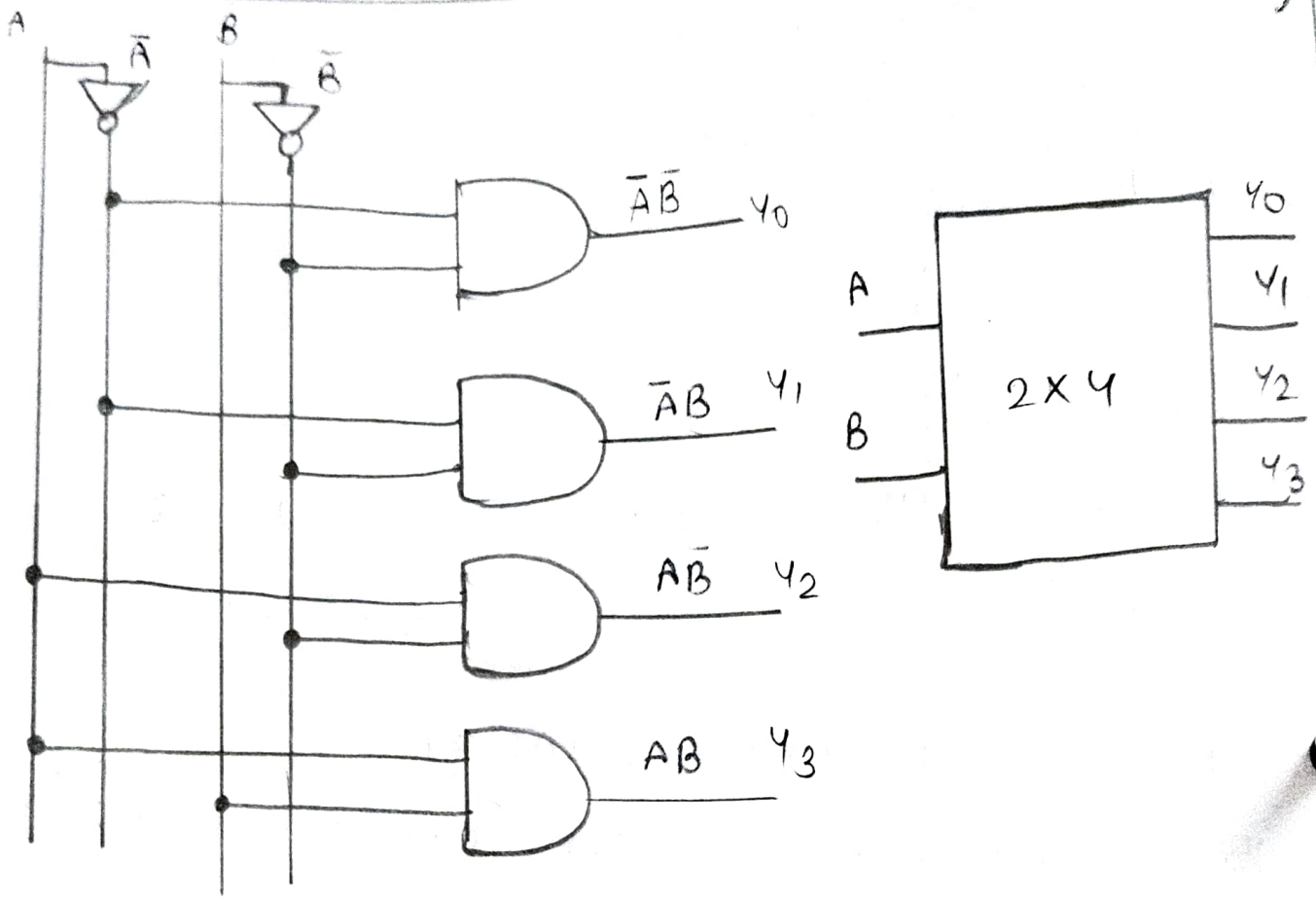
answer : 2^{15}

size of memory $32K \times 16 = 2^5 \times 2^{10} \times 16$

$= 2^{15} \times 16 = 2^p \times n$

number of address line $= p = 15$

15 number address line can generate 2^{15} numbe of different address and each of these address will be access through output of decoder, so the size of decoder needed is 15×2^{15} which need 2^{15} number of AND gate in 2x4 Decoder internal structure.



2X4 decoder need 4 AND gates

2×2^{15} decoder need 2^{15} AND gates

Basically, number of AND gate needed for a decoder is equal to number of output lines of decoder.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC103/Digital Electronics

Course Coordinator : Dr. G.Sasikala

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		Course Handling Faculty : Dr. J.Nirmal Jothi		
1	VTU22812	KOLLA MOHAN	9.35	29
2	VTU22856	MANISHA A	8.95	30
3	VTU23302	S PREETHIKA	8.8	30
4	VTU23355	KOTAPATI RAJESH	8.9	24.5
5	VTU23431	VUNNAM GAYATHRI	9.3	29
6	VTU23640	SHAIK NAGOOR JANI	8.6	25
7	VTU23665	KORAKUTI THRISHANTH KUMAR	8.56	24.5
8	VTU23784	PERURI VEERA VENKATA NAGA DURGA SRIKRISHNA	8.6	25
9	VTU24177	ADURI VISHNU SREE PAVAN KOTESH	9.16	26.5

Training / Activities Conducted for fast learners

Training given to solveGATE questions

Criteria for fast learners:CGPA greater than 8.5 and Test1 greater than24

Improvement/ Achievement of fast learners

Scored more marks in CIA

Faculty **HOD**

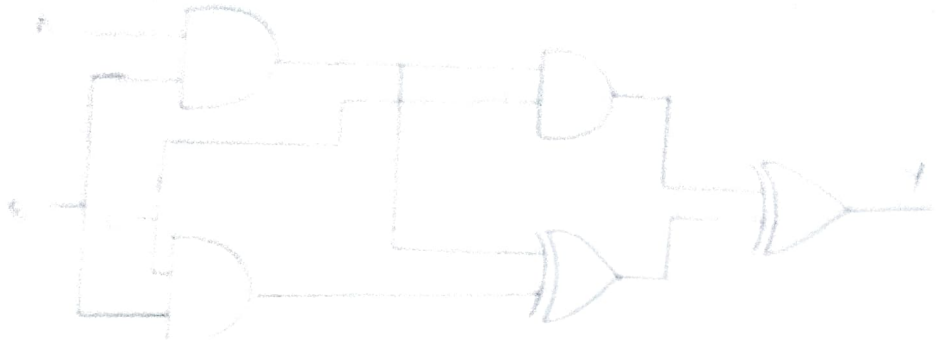
A. MANISHA
VTU 22856
(Section B)

DE GATE QUESTIONS

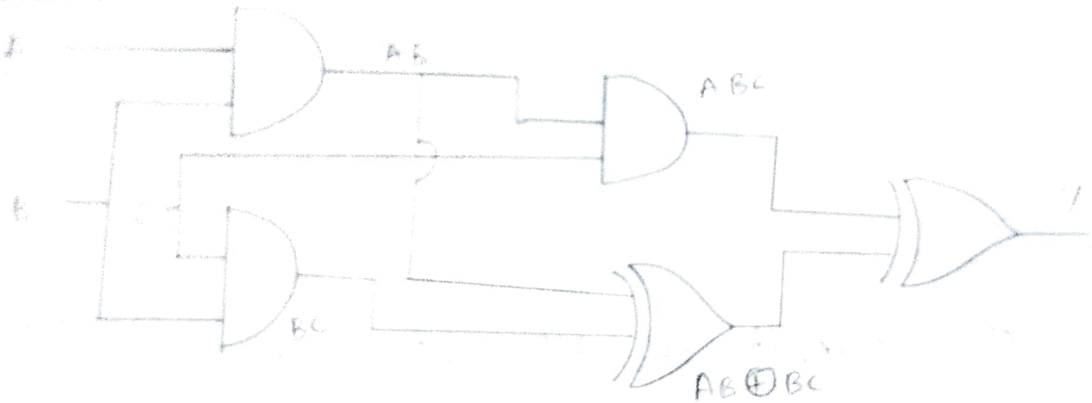
(1) The output of the combinational circuit given below is

Ans: $B(C+A)$

Diagram



Explanation:



$Y = ABC \oplus (AB \oplus BC) = (ABC)(AB \odot BC) + (AB$

consider $AB \odot BC = (AB)(BC) + AB = ABC + (\bar{A}+\bar{B})(\bar{B}+\bar{C})$

$= ABC + \bar{A}\bar{B} + \bar{B}$

$= ABC + \bar{A}\bar{C} + \bar{B}$

$= \bar{A}\bar{C} + (B+\bar{B})(AC+\bar{B})$

$= (ABC)(AB \odot BC)$

$= (ABC)(\bar{A}\bar{C} + AC + \bar{B}$

$ABC(AB \oplus BC) = AB(\bar{B}\bar{C}) + \bar{A}\bar{B}(BC) = AB(\bar{B}+\bar{C})(\bar{A}+\bar{B})$

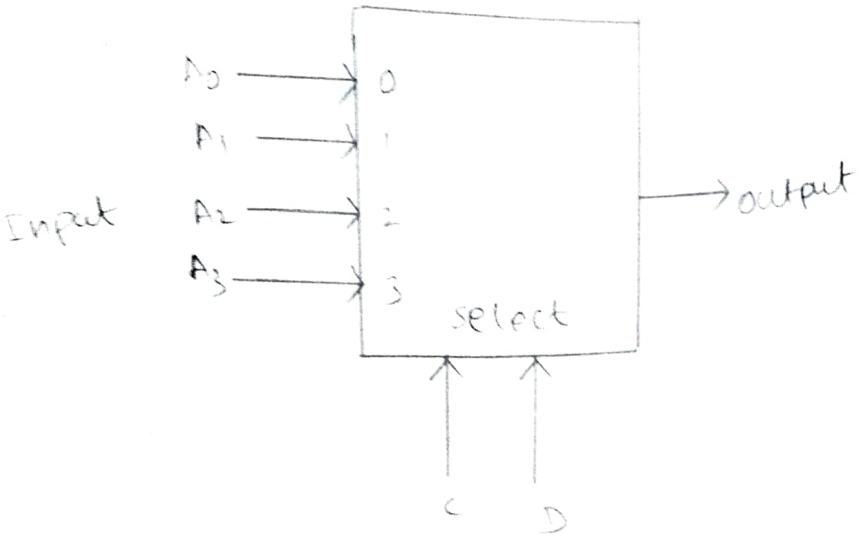
$\therefore Y = ABC + \bar{A}BC + AB\bar{C} = B\bar{C} + AB\bar{C}$

$= B(C+\bar{C})(C+A) = B + (C+A)$ //

(2) Consider the 2-bit multiplexer (MUX) shown in the figure. For OUTPUT to be the XOR of C and D, the values for A_0, A_1, A_2 and A_3 are

Ans: $A_0 = 0$, $A_1 = 1$, $A_2 = 1$, $A_3 = 0$

Diagram



Explanation:

Sol:

The output of MUX, F is

$$F = \bar{S_1}\,\bar{S_0}\,I_0 + \bar{S_1}\,S_0\,I_1 + S_1\,\bar{S_0}\,I_2 + S_1 S_0\,I_3$$

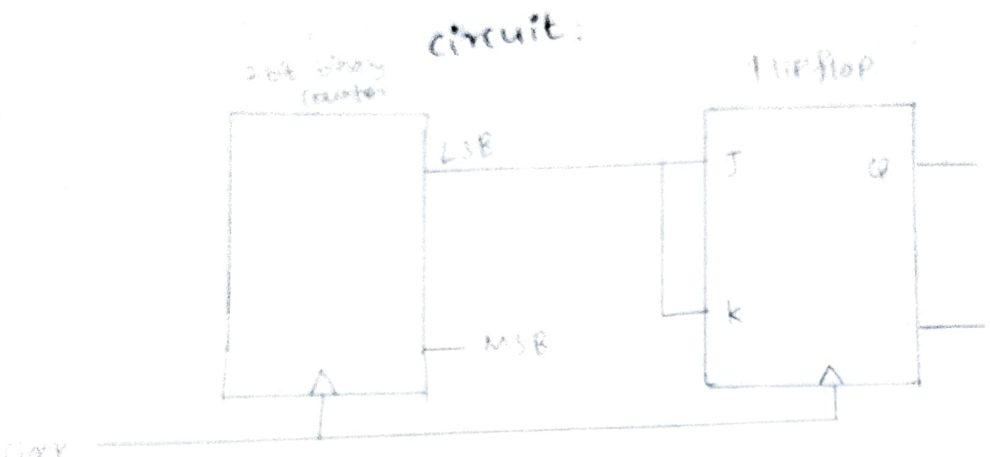
$$F = \bar{C}\,\bar{D}\,A_0 + \bar{C}\,D\,A_1 + C\bar{D}\,A_2 + CD\,A_3$$

But output, $F = C \oplus D = \bar{C}D + C\bar{D}$

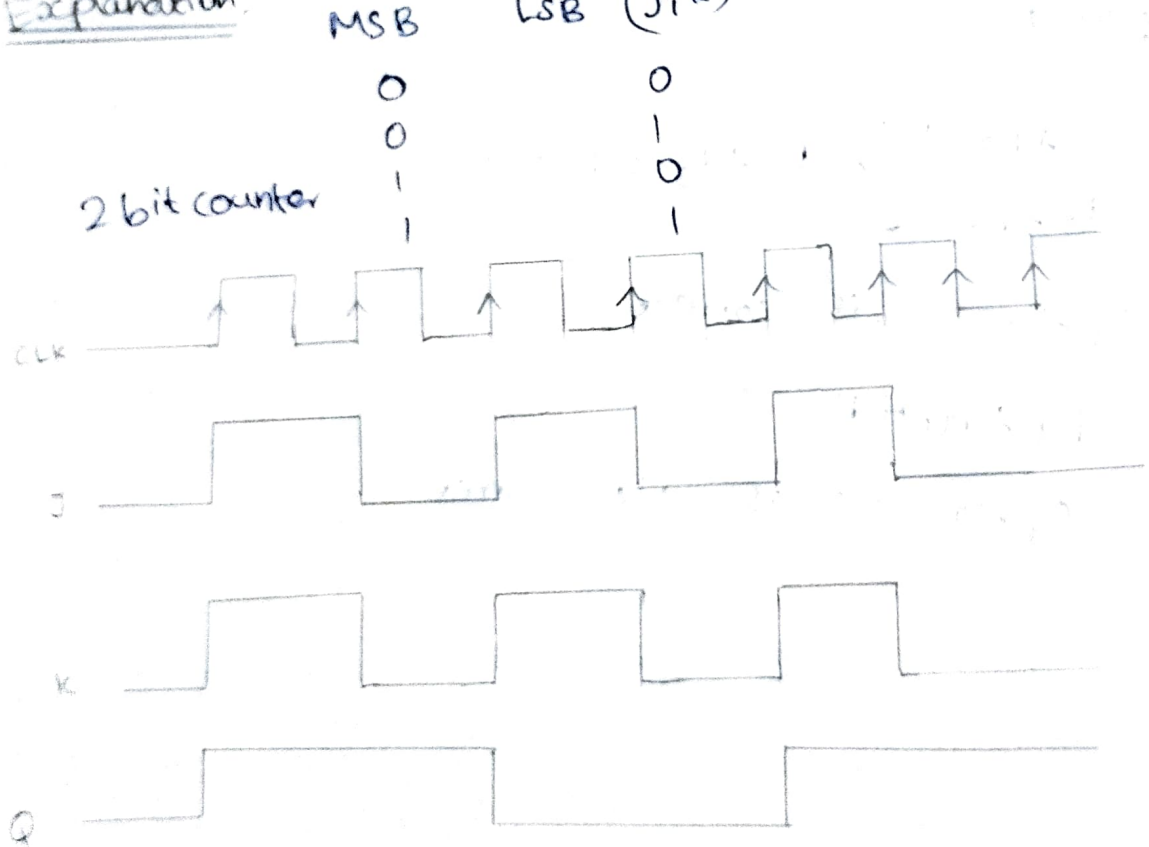
∴ Inputs of MUX are, $A_0 = 0$, $A_1 = 1$, $A_2 = 1$

③ For the circuit shown, the clock frequency is f_0 and the duty cycle is 25%. For the signal at the Q output of the flip flop.

Ans: frequency is $f_0/4$ and duty cycle is 50%.



Explanation:



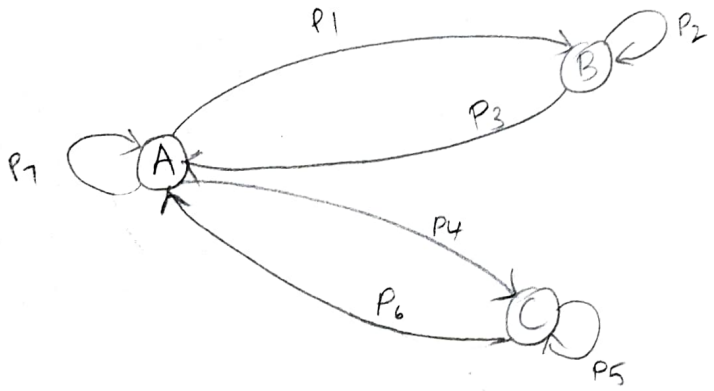
∴ Duty cycle = 50%

Output frequency = $\frac{f_0}{4}$

(4.) A state transition diagram with state A, B, and C and transition probabilities $P_1, P_2, \ldots, P_7$ is shown in figure (e.g. P_1 denotes the probability of transition from state A to B). For this state diagram, select the statements which is/are universally true.

Ans: $P_2 + P_3 = P_5 + P_6$ & $P_1 + P_4 + P_7 = 1$

Diagram:



Explanation:

$$\left.\begin{array}{l} P_2 + P_3 = 1 \\ P_5 + P_6 = 1 \end{array}\right\} \quad P_2 + P_3 = P_5 + P_6$$

Option (a) is correct

$P_1 + P_4 + P_7 = 1$

Option (c) is also correct.

(5) A traffic signal cycles from GREEN to YELLOW, YELLOW to RED and RED to GREEN. In each cycle, GREEN is turned on for 70 seconds, YELLOW is turned on for 5 seconds and the RED is turned on for 75 seconds. This traffic lights has to be implemented using a finite state machine (FSM). The only input to this FSM is a clock of 5 second period. The minimum number of flip-flops required to implement this FSM is

Ans: 5 to 5

Explanation:
According to the question,
Green is turned ON for 70 seconds
Yellow is turned ON for 5 seconds.
Red is turned ON for 75 seconds
∴ Total time to complete one cycle for all 3 lights
= (70+5+75) seconds = 150 seconds.
Available time period of clock = 5 seconds
Total number of clock cycles in one complete cycle
$= \frac{150}{5} = 30$
Assume number of flip-flops required = n
we know possible number of states using n flipflops
so to get 30 clock cycle (or) 30 states,

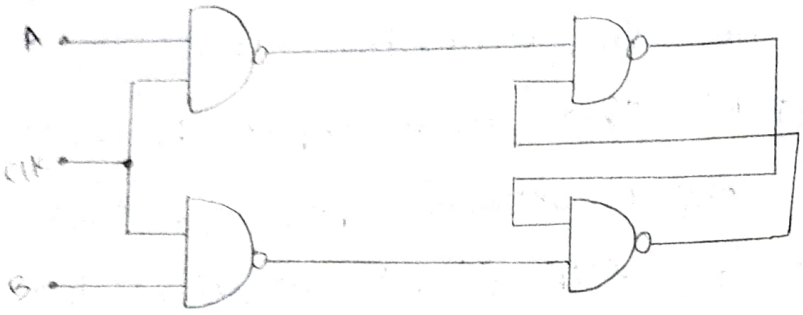
$2^n > 30$
$\Rightarrow n \geq 4.90$

∴ Minimum number of required flip flops is = 5

(6) Consider the given circuit. In this circuit, the race around

Ans: does not occur

Diagram



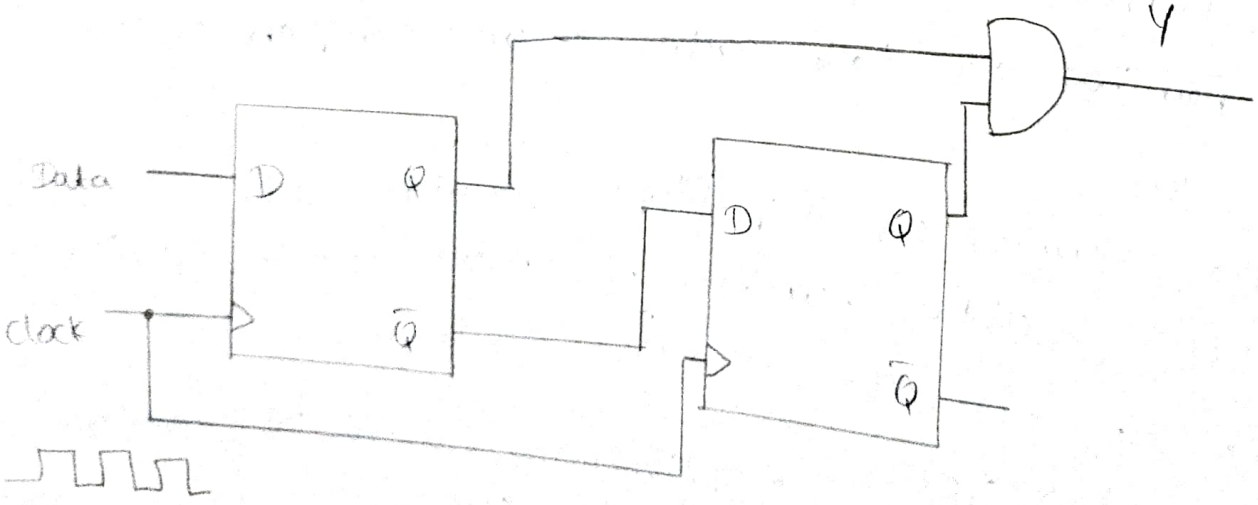
Explanation:

The circuit shown is that of an activitge High clocked R-S flip-flop with S=A and R=B. The race condition does not occurs in these flip-flops.

(7) When the output Y in the circuit below is '1', it implies that data has

Ans: changed from 0 to 1

Diagram



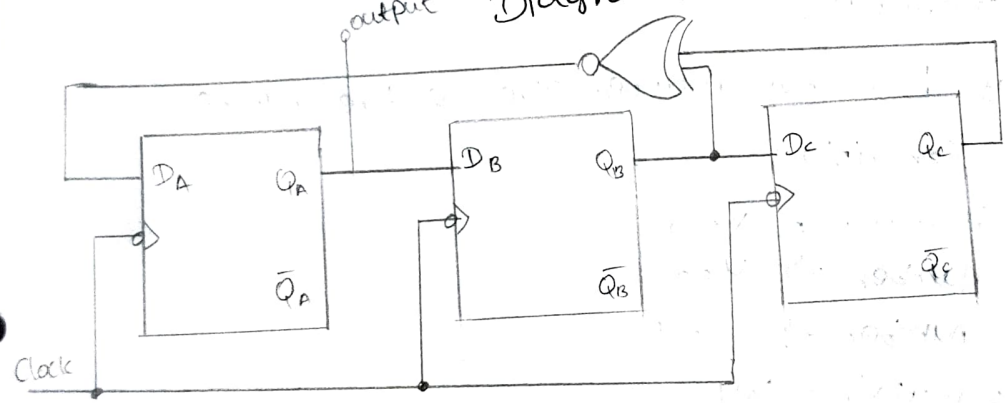
Explanation:

Presently, Y = 1. This implies that prior to clock pulse: both the D inputs were in logic '1' state. This further implies that Q-output of the first-flop was in logic '0' state. This can result from its D inputs being previously in logic '0' state. Hence, the data input has changed from 0 to 1.

(8) Assuming that all flip flops are in reset condition initially, the count sequence observed at Q_A in the circuit shows is

Ans: 01101100...

Diagram:-



Explanation:-

Initially, Q_A, Q_B, Q_C are '0'. This makes D_A = '1'. With the first clock pulse, Q_A become '1', Q_B and Q_C remain in logic '0' state. D_A is still '1'. With the second clock pulse; Q_A remains in logic '1' state. Q_B becomes '1'. Q_C remains '0'. D_A becomes '0'. With the third clock pulse, Q_A becomes '0'. The first four entries of Q_A therefore are 0110. This matches with only the answer given in option. (d).

(9.) Two 2's complement numbers having sign bits x and y are added and the sign bits of the result is 'z'. Then the occurrence of overflow is indicated by the Boolean function

Ans: $\bar{x}\bar{y}z + xy$

Solution:

Let A and B two numbers and s = sum

$A = x \ldots\ldots b_1 b_0$

$B = y \ldots\ldots c_1 c_0$

$S = z \ldots\ldots s_1 s_0$

Condition of overflow are

1.) Sum of two +ve number given a -ve number there will be overflow.

2.) Sum of two -ve number gives a +ve number.

In first condition

A → +ve number ⇒ $x = 0$

B → +ve number ⇒ $y = 0$

S → -ve number ⇒ $z = 1$

(Boolean function)$_1$ = $\bar{x}\bar{y}z$

Now second condition:-

A → -ve number ⇒ $x = 1$

B → -ve number ⇒ $y = 1$

S → +ve number ⇒ $z = 0$

(Boolean Function)$_2$ = $xy\bar{z}$

Boolean function = $\bar{x}\bar{y}z + xy\bar{z}$

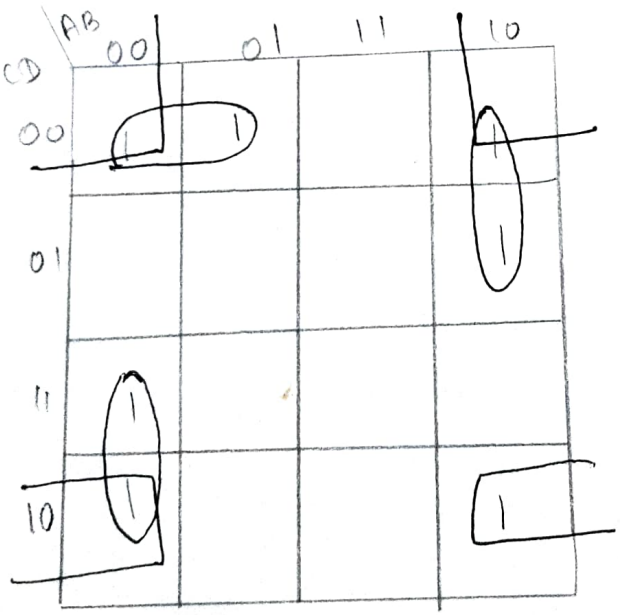
(10) The k-map for a boolean function is shown in figure. The number of essential prime implicants for this function is

Ans: 4

Solution:

CD \ AB	00	01	11	10
00	1	1	0	1
01	0	0	0	1
11	1	0	0	0
10	1	0	0	1

Sol::



Number of essential prime implicants=

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC103 Digital Electronics

Course Coordinator : Dr G Sasikala

Course Handling Faculty : Dr R Sathesh Raaj

Section : J

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
1	VTU20990	RANGALA NAVEEN REDDY	8.5	26
2	VTU24266	AKSHAYA PRASATH R	8.6	25.5
3.	VTU24298	NALLURI VEERA VIGNESH	8.5	26.5

Training / Activities Conducted for fast learners

- Motivated to solve previous year university questions
- Shared previous year gate problems for their preparation.

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners

- The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions.

R. Sathesh Raaj
Faculty

Course Coordinator

HOD Sign

AKASHAYA PRASATH R
VTU24266

10/10/2023

GATE QUESTIONS

The output Y of a 2 bit comparator is logic 1 whenever the 2 bit input A is greater than the 2 bit input B. The number of combinations for which the output is logic 1, is

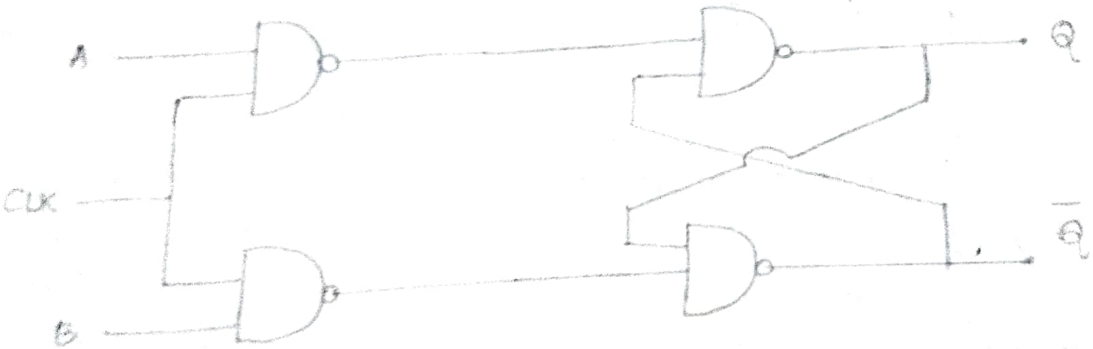
(A) 4 (B) 6 (C) 8 (D) 10

Answer :- (B)

Exp :-

INPUT A		INPUT B	
A_2	A_1	B_2	B_1
0	0	0	0 0
0	0	0	1 0
0	0	1	0 0
0	0	1	1 0
0	1	0	0 1

Consider the given circuit



In this circuits, the race around

(A) does not occur

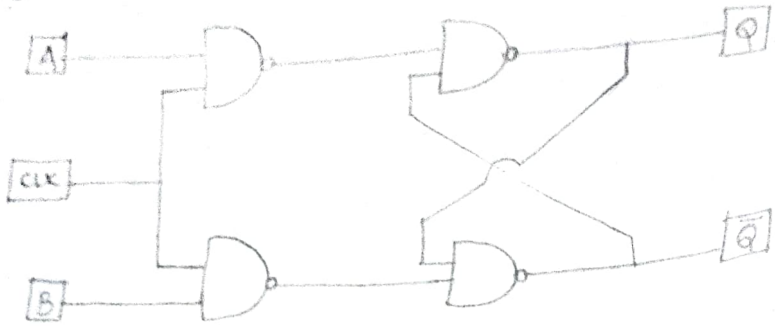
(B) occurs when CLK = 0

(C) occur when CLK = 1 and A = B = 1

(D) occurs when CLK = 1 and A = B = 0

Answer :- (A)

Exp :-



$$Q_{next} = \overline{\overline{A \cdot CLK \cdot \bar{Q}}}$$

$$= A \cdot CLK + Q$$

$$\bar{Q}_{next} = A \cdot CLK + \bar{Q}$$

if CLK = 1 and A and B = 1

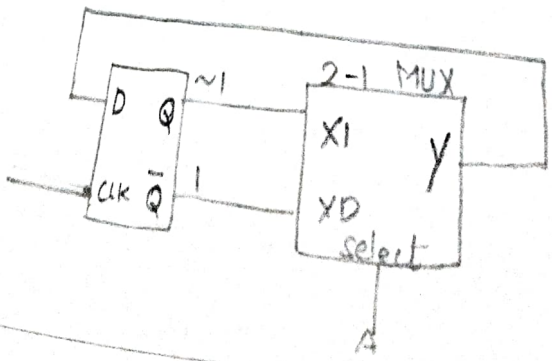
then $Q_{next} = 1$, $\bar{Q}_{next} = 1$ } no race around

if CLK = 1 and A = B = 0

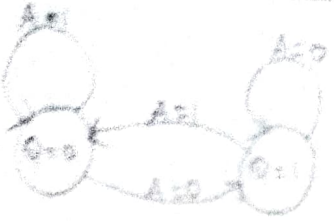
$Q_{next} = Q$, $\bar{Q}_{next} = \bar{Q}$ } no race around.

Thus race around does not occur in the circuit.

The state transition diagram for the logic circuit shown is



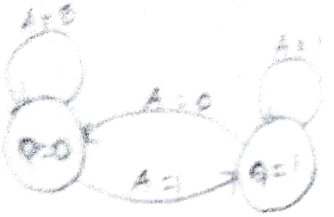
(A)



(B)



(C)

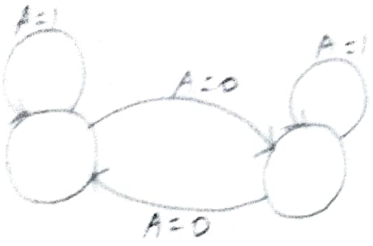


(D)



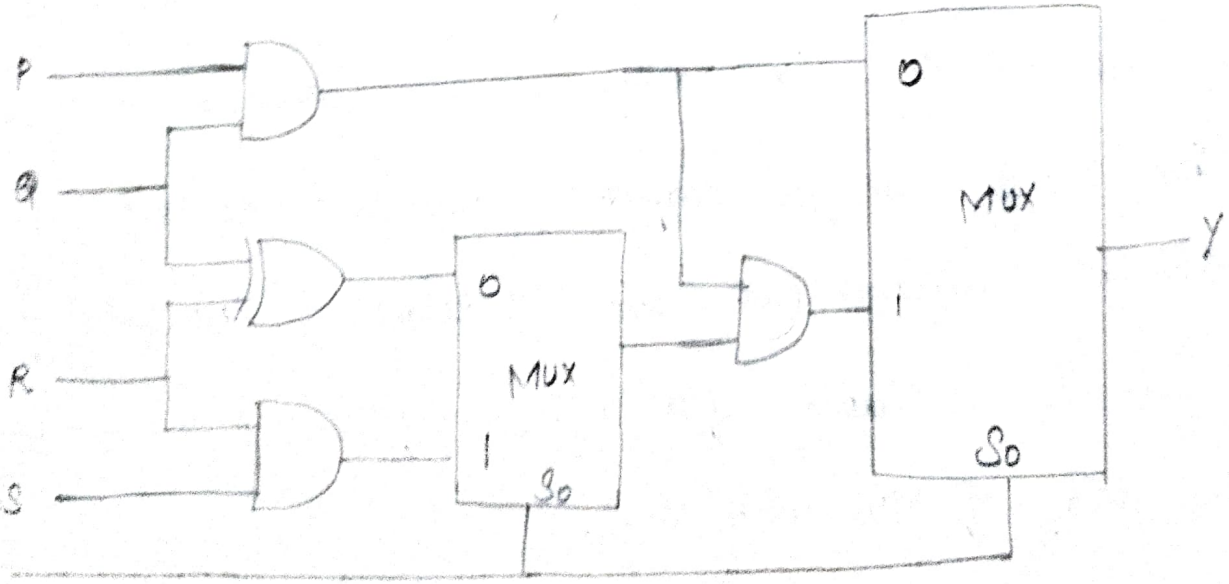
Answer :- (D).

Exp :- $A = 0, \; Y = Q$ } whenever $A = 1$, output gets into same state
$A = 1, \; Y = \bar{Q}$ }



Whenvere $A=0$, output gets toggled.

The propagation delays of the XOR gate, AND gate and multiplexer (MUX) in the circuit shown in the figure are 4ns, 2ns and 1ns respectively

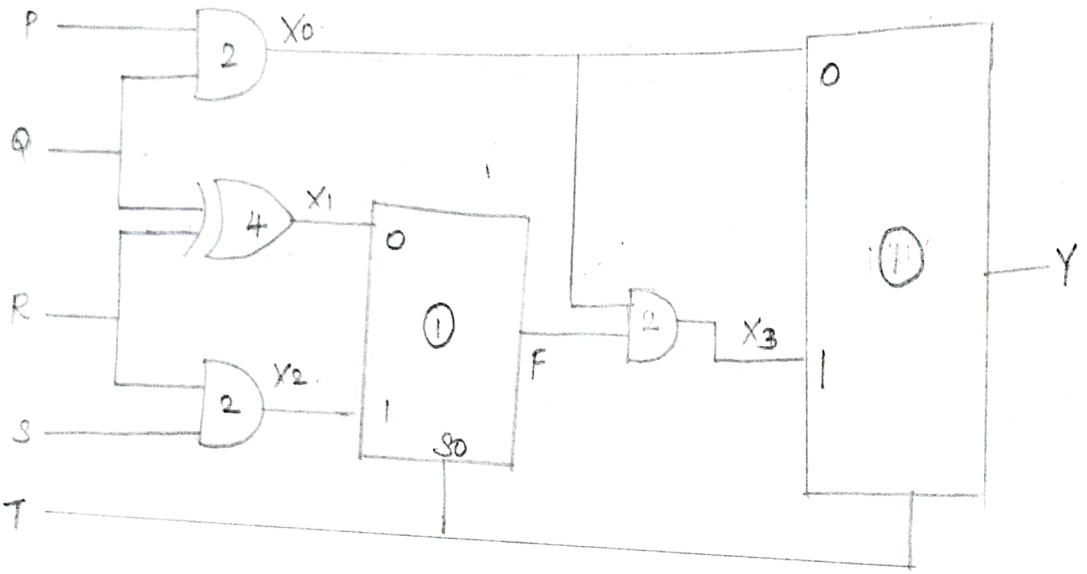


If all the inputs P, Q, R, S and T are applied simultaneously and held constant, the maximum propagation delay of the circuit is

(A) 3ns (B) 6ns (C) 5ns (D) 7ns

Answer :- (B).

The given combination circuit is



When $T=0$, to get output only signal x_0 is essential for second MUX, so the delay involved in this case in 2n sec for x_0. MUX delay 1 nsec, total 2+1 = 3 nsec.

When $T=1$, to get output y we need X_2 and X_3. X_2 will be available at 2nsec (delay of AND gate)

F will be available after 1 nsec of X_2 2+1 = 3nsec (i.e, delay of MUX with X_2),

X_3 will available after 2n sec of F i.e. 3+2 = 5 n sec.

Y will be available after 1 nsec of X3 i.e., 5+1 = 6 nsec

When T = 0, we get Y at 3 nsec.

T = 1, we get Y at 6 nsec.

Worst case delay is 6nsec.

Addressing of a 32K x 16 memory is realized using a single decoder. The minimum number of AND gates required for the decoder is.

(A). 2^8 (B). 2^{19} (C) 2^{15} (D). 2^{32}.

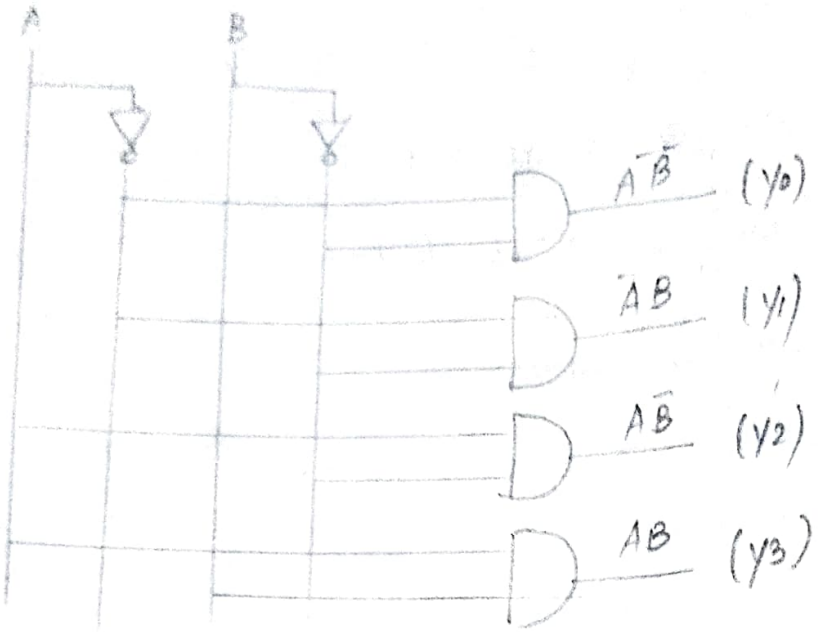
Answer :- (C).

Size of memory $32K \times 16 - 2^5 \times 2^{10} \times 16 - 2^{15} \times 16 - 2^P \times n$

Here number of address line = $p = 15$.

15 address line can generate 2^{15} number of diffrent address, and each of these address will be access through output of decoder, so the size of decoder is needed is 15×2^{15} which needs 2^{15} number of AND gate.

In a 2×4 Decoder the Internal structure is.



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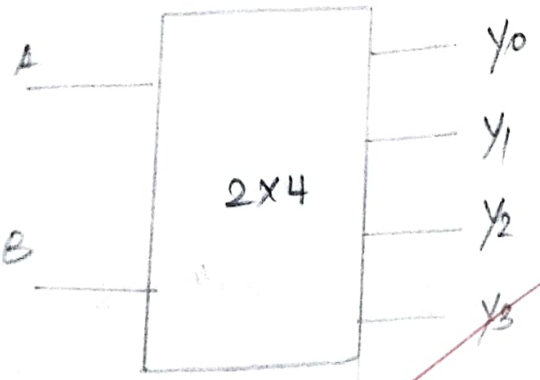

So, a 2x4 decoder needed 4 AND gate

2×2^{15} decoder need 2^{15} AND gate.

Basically, number of AND gate needed for a decoder is equal to number of output lines of decoder.

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DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		**Course Handling Faculty :** Dr.K.E.Purushothaman		
		Nil		

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

K.E.Purushothaman
Faculty Signature

Course Coordinator

HOD/ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		Course Handling Faculty : Dr. Vignesh Prasanna N		
1	NIL			
2				
3				
4				

Training / Activities Conducted for fast learners

Nil

Improvement/ Achievement of fast learners

Nil

Faculty Signature **CC Signature** **HOD Signature**

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DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		**Course Handling Faculty :** Dr.R.Nanmaran		
		Nil		

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

Faculty Signature

Course Coordinator

HOD/ ECE

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DEPARTMENT OF ECE
VTRUGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr. Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		**Course Handling Faculty : Dr. Rahul S G**		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.6	28.5
2	VTU23099	P S DINESH KUMAR	9.2	27.5
3	VTU23559	G SAHITHI	9.0	28
4	VTU23626	KOTIPALLI V S SUBRAHMANYESWARI	9.6	28.5
5	VTU23650	SURA RAKESH REDDY	9.67	25
6	VTU23741	YARRAGOLLA VENKATA SAI	9.5	27.5
7	VTU24177	ADURI VISHNU SREE PAVAN KOTESH	9.1	27.5

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Encouraged to develop their technical and teamwork skills by participating in various IEEE Student Chapters and Department Club events.
- Motivated them to participate in workshops.

Improvement/ Achievement of fast learners

Few students enrolled themselves in IEEE Student Branch Chapters and participated in workshops.

Faculty **Course Coordinator** **HoD**

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that A. Vishnu [VTU24177], II Year, ECE Student, *of* Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science And Technology *has participated in the* ***Two days Hands-on Workshop*** *on* ***"LoRa Gateway based SoC"*** *organized by the Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.*

A. Selwin Mich Priyadharson
HoD-ECE

Dr. R. S. Valarmathi
DEAN-SoEC

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DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Title: **Linear Integrated Circuits**

Academic Year: **2023 - 2024**

Course Coordinator: **Dr.Vignesh Prasanna N**

Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

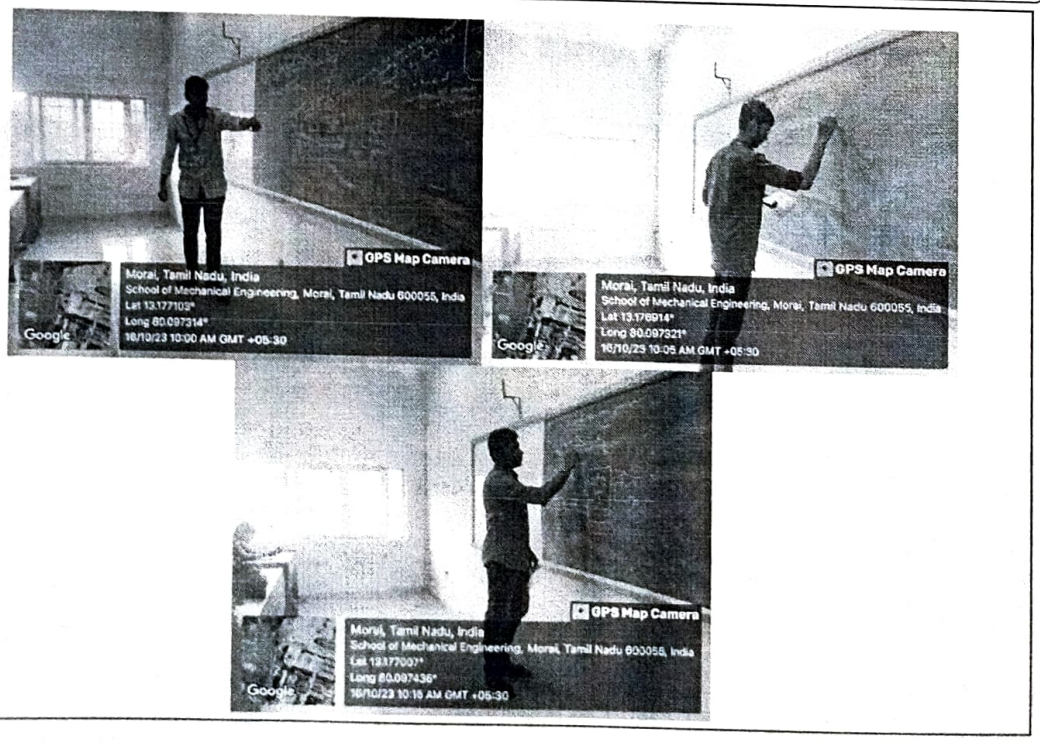
Date after Test-1: **16/10/2023**

Course Code:**10211EC104**

Semester: **Summer**

Sl.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 1	Category
1.	21963	CHENNU VENKATESWARA RAO	30	A
2.	26988	PARIMI NAGA SAI RAM	29	A
3.	27030	KANDUKURI YOGINI RAMA	29	A

Action Planned: To motivate the other classmates and improve the class learning environment, the fast learners needed to shared their approach towards solving the questions (theory as well as problems) related to the course contents, where, a seminar-type presentation to be conducted regularly to encourage discussion sessions among the fellow students.



Course Handling Faculty

Course Coordinator

HOD ECE

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B. TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

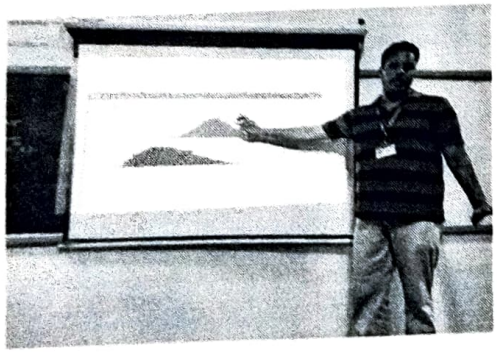
Course Code and Title :10211EC110/Data Communication Networks

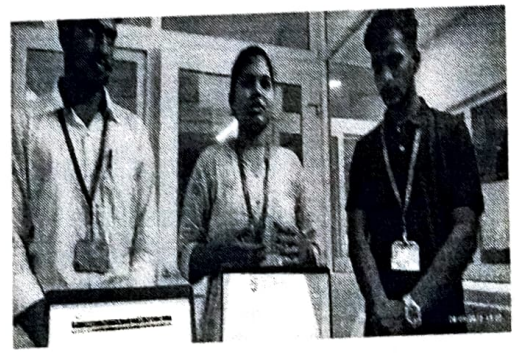
Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty :Dr.D.David Neels Ponkumar**		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.5	28
2	VTU22856	MANISHA A	8.6	28
3	VTU23711	MYLAMURU LAKSHMI PRASANNA	8.9	29
4	VTU21752	GRANDISILA POORNA CHAITANYA	9.3	29
5	VTU22812	KOLLA MOHAN	8.9	29

Training / Activities Conducted for fast learners

- Students were encouraged to do Seminars.





Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

It improved their presentation skills and removed stage fear. It will equip them for placement.

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC110/ Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty :** Dr.K.Aanandha Saravanan		
Nil				

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners
-

Improvement/ Achievement of fast learners
-

Faculty Signature

CC Signature

HOD Signature

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTU R21 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 – Data Communication Networks

Category: Program Core

Course Coordinator : Dr.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance in Test- 1 CIA	Category
Slot: S3		Course Handling Faculty :Mrs.C Ambika Bhuvaneswari		
1.	VTU23626	KOTIPALLI V S SUBRAHMANYESWARI	30	9.1

Training / Activities Conducted for fast learners

1. Encouraged the Students to take up Koggle data Contest.
2. Advised the students to register and learn professional coding in Upgrade, Great learning etc., and to participate in advanced learning.

Criteria for fast learners: Test 1 greater than 25 with CGPA of 8.5

Improvement/ Achievement of fast learners

1. They can start their own project work in their academics

Faculty Signature **CC Signature** **HOD Signature**

IEEE

Certificate of Participation

This is to certify that

VALLI SRI SUBRAHMANYESWARI KOTIPALLI

From team Rangers Participated in IEEEXtreme 17.0 Programming

Competition that Hosted +17,000 Participants

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Dr. K. Subramanian
Technical Lead
Enthu Technology Solutions

Dr. A. Selwin Mich Priyadharson
HoD-ECE

Dr. R. S. Valarmathi
DEAN-SoEC

Vel Tech
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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : E		Course Handling Faculty : Dr. Dasari Naga Vinod		
1.	VTU22084	PILLARAM NEHA REDDY	9.6	26
2.	VTU22746	CHAPPATI PADMA PRIYA	8.9	26
3.	VTU23761	GUGGILLA JEEVARATHNAM	8.6	26
4.	VTU21520	KARPURAPU HANISHKA	9.1	26

Training / Activities Conducted for fast learners

- Provided GATE sample question papers related to Data Communication Networks.

Criteria for fast learners: CGPA 8.5 and Test 1 greater than 25 marks

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

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Computer Networks GATE Questions

Computer Networks is an exciting topic covered by the GATE CSE Question Paper. The candidates are also advised to solve and practise these Computer Networks GATE questions. Some of the main concepts that constitute the Computer Networks GATE questions with answers PDF are Data Link Layer, IP Addressing, Network Security and more. Candidates are also advised to refer to the collection of GATE Questions Computer Networks that we have listed here in this article below.

Computer Network is an important topic covered in the GATE CSE question paper. Candidates can refer to these Computer Network Questions for GATE to get the best results. Solving these questions will help the candidates to prepare more proficiently for the GATE exams. Candidates can first solve these questions and then refer back to the answers to gauge their performance. Meanwhile, candidates can find the Computer Networks GATE Question with Answers in this article below. They can also refer to these GATE previous year question papers (https://byjus.com/gate/previous-year-question-papers/) and start preparing for the exams.

Note: *We shall be updating the answers/ solutions for these questions soon.*

Computer Network GATE Questions with Solutions

From The Computer Network Topic of the GATE CSE Question Paper

MCQ – Single Answer Computer Networks GATE Questions

1) What is the protocol data unit (PDU) for the application layer in the Internet stack?

a. Frame

b. Datagram

c. Segment

d. Message

2) Which among this is not a client-server application?

a. Ping

b. Web-browsing

c. Internet Chat

d. Email

3) If an Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it:245.248.128.0/20 and the ISP wants to give half of this chunk of address to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Then, which among the following is a valid allocation of addresses to A and B?

a. 245.248.132.0/22 and 245.248.132.0/21

b. 245.248.136.0/21 and 245.248.128.0/22

c. 245.248.128.0/21 and 245.248.128.0/22

d. 245.248.136.0/22 and 245.248.132.0/21

4) The pairs of OSI protocol layer/sub-layer and its functionality are given below, the INCORRECT pair from among these are:

a. Data Link Layer and Bit synchronization
b. Network Layer and Routing
c. Medium Access Control sub-layer and Channel sharing
d. Transport Layer and End-to-end process communication

Hi there! Got any questions? I can help you.

5) A firewall is installed at the point where the secure internal network and untrusted external network meet, which is also known as_____

a. Secure point

b. Meeting point
c. Chock point
d. Firewall point

6) What does DHCP stand for?

a. Dynamic Host Configuration Protocol
b. Dynamic Host Configuration Provider
c. Digital Host Communication Provider
d. Digital Host Communication Protocol

7) The growth of congestion window occurs_____

a. Infinitely
b. Up to timeout
c. Up to threshold
d. Up to the size of receiver's window

8) When was Aloha developed?

a. In 1990
b. In 1980
c. In 1970
d. In 1960

9) Which of these is a Transmission media that can be used in LAN?

a. fibre optics
b. coaxial cable
c. microwave
d. satellite

10) Which of these protocols given below uses UDP as transport protocol?

a. DNS
b. Telnet
c. HTTP
d. SMTP

11) LANs can be connected by a device known as _____

a. Ethernet card
b. Modems
c. Routers
d. Bridges

12) What is the bit rate in Ethernet when Manchester encoding is used?

a. Same as the baud rate
b. Twice the baud rate
c. Half the baud rate
d. None of these

13) What is slot time for gigabit Ethernet?

a. 0.612
b. 0.512
c. 0.412
d. 0.312

14) Radio waves are _____

a. directional
b. bidirectional
c. omnidirectional
d. unidirectional

15) The term that refers to the shortest unit and carries data elements is_____

a. Single element
b. Data carrier
c. Signal element
d. Both b and c

16) Which architecture is FTP built on?

a. P2P
b. Client-server
c. Both the above
d. None of these

17) What is the address resolution protocol (ARP) used for?

a. Finding the IP address of the default gateway
b. Finding the MAC address that corresponds to an IP address
c. Finding the IP address that corresponds to a MAC address
d. Finding the IP address from the DNS

Which of the following are not true characteristics of NetBEUI?

a. Fast for small networks to Self-tuning
b. Little configuration required
c. Routable
d. Highly customizable

) Identify the correct option for the given assertion and reason

ssertion: In IEEE 802.3 is not suitable for client server application

eason: In Ethernet, there is a restriction on minimum size.

. Assertion and Reason, both are true

. Assertion and reason are false

. Assertion is true and reason is false

d. Assertion and reason are true, but this is not the correct reason for the given assertion

20) Consider that a computer on a 10Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 2Mbps. It is initially filled to capacity with 16 Megabits. What is the maximum duration for which the computer can transmit at the full 10Mbps?

a. 8 seconds
b. 5 seconds
c. 2 seconds
d. 1.6 seconds

21) In Unicast Routing, we use shortest path tree method for finding shortest path of the_____

a. Nodes
b. Networks
c. Packets
d. Frames

22) Which is the network that provides high speed connectivity?

a. Internetwork
b. WAN
c. LAN
d. MAN

23) What is the maximum number of subnets and the maximum number of hosts in each subnet, if the address of a class B host is to be split into subnets with a 6-bit subnet number?

a. 64 subnets and 262142 hosts

b.62 subnets and 262142 hosts

c. 64 subnets and 1024 hosts

d. 62 subnets and 1022 hosts

24) Which of the following statements about HTTP are false?

a. HTTP describe the structure of web page
b. HTTP run over TCP
c. HTTP can be used to test the validity of hyper link test
d. HTTP allows information to be stored in url

25) What is an anticipated result from multi programming operations?

a. Handling of more jobs
b. Reduced computer idle time
c. Better scheduling of work
d. All of the above

26) What is the Network, in which every computer is capable of playing the role of client, server or both at the same time?

a. dedicated server network
b. local area network
c. wide area network
d. peer-to-peer network

27) Match the following:

(P) SMTP	(1) Application layer
(Q) BGP	(2) Transport layer
(R) TCP	(3) Data link layer
(S) PPP	(4) Network layer
	(5) Physical layer

(a) P – 2 Q – 1 R – 3 S – 5

(b) P – 1 Q – 4 R – 2 S – 5

Hi there! Got any questions? I can help you.

(c) P - 1 Q - 4 R - 2 S - 3

(d) P - 2 Q - 4 R - 1 S - 3

28) If a CSMA/CD network that transmits data at a rate of 100 Mbps (10^8 bits second) over a 1 km(kilometer) cable with no repeaters and the minimum frame size required for this network is 1250 bytes, what is the signal speed (km/sec) in the cable?

a. 16000
b. 20000
c. 10000
d. 8000

29) One of the header fields in an IP datagram is the Time to Live (TTL) field. Which of these below given statements best explains the need for this field?

(a) It can be used to reduce delays

(b) It can be used to optimize throughput

(c) It can be used to prioritize packets

(d) It can be used to prevent packet looping

30) A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide, and A wins the first back off race. At the end of this successful transmission by A, both A and B attempt to transmit and collide. The probability that A wins the second back off race is____

a. 0.625
b. 0.75
c. 0.5
d. 1.0

31) In a packet switching network, packets are routed from source to destination along a single path having two intermediate nodes. If the message size is 24 bytes and each packet contains a header of 3 bytes, then what is the optimum packet size?

a. 4
b. 6
c. 7
d. 9

32) Station B needs to send a message consisting of 9 packets to Station C using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that B transmits gets lost (but no acks from C ever get lost), then what is the number of packets that B will transmit for sending the message to C?

a. 14
b. 16
c. 12
d. 18

33) Which of the following assertions about the Internet Protocol (IP) is False?

a. IP Packets from the same source to the same destination can take different routes in the network
b. The packet source cannot set the route of an ongoing packets; the route is only determined by the routing tables in the routers on the way
c. IP ensures that a packet is discarded if it is unable to reach its destination within a given number of hops
d. It is possible for a computer to have multiple IP addresses

34) For an organization that has a class B network and wishes to form subnets for 64 departments, what will the subnet mask be?

a. 255.255.64.0
b. 255.255.64.0
c. 255.255.128.0
d. 255.255.252.0

35) The message 11001001 is to be transmitted using the CRC polynomial x^3 + 1 to protect it from errors. The message that should be transmitted is_____

a. 11001001011

b. 11001001000

c. 110010010011

d. 11001010

36) If two computers C_1 and C_2 are configured as follows and C_1 has IP address 203.197.2.53 and netmask 255.255.128.0, while C_2 has IP address 203.197.75.201 and netmask 255.255.192.0, then which of the following statements is true?

a. C_2 assumes C_1 is on the same network, but C_1 assumes C_2 is on a different network
b. C_1 assumes C_2 is on the same network, but C_2 assumes C_1 is on a different network
c. C_1 and C_2 both assume they are on different networks
d. C_1 and C_2 both assume they are on the same networks

37) Look at these three statements about link state and distance vector routing protocols, for a large network with 500 network nodes and 4000 links

[S_1] The computational overhead in link state protocols is higher than in distance vector protocols.

[S_2] A distance vector protocol (with split horizon) avoids persistent routing loops, but not a link state protocol.

[S_3] After a topology change, a link state protocol will converge faster than a distance vector protocol.

ch one of the following is correct about S_1, S_2, and S_3?

a. S_1, S_2, and S_3 are all false
b. S_1, S_2, and S_3 are all true
c. S_1 and S_2 are true, but S_3 is false
d. S_1 and S_3 are true, but S_2 is false

Which of these functionalities should be implemented by a transport protocol over and above the network otocol?

a. Detection of duplicate packets
b. End to end connectivity
c. Packet delivery in the correct order
d. Recovery from packet losses

39) If the length of a Broadcast LAN is 2 Km and it has 107 bps bandwidth and uses CSMA/CD and the signal travels along the wire at 2108m/s, then what is the minimum size of the packet?

a. 100 bytes
b. 200 bytes
c. 50 bytes
d. None of these

40) Which is one of the pairs of protocols given below from both the protocols that can use multiple TCP connections between the same client and the server?

a. HTTP, TELNET
b. HTTP, SMTP
c. FTP, SMTP
d. HTTP, FTP

41) What is the number of 8-bit characters that can be transmitted per second over a 9600 baud serial communication link that use asynchronous mode of transmission with 8 data bits, one start bit and one parity bit?

a. 800
b. 600
c. 876
d. 1200

42) In the starting phase of TCP congestion control algorithm size of congestion control window_____

a. Increase Linearly
b. Does not increase
c. Increase exponentially
d. Increase

43) If a sender is employing public key Cryptography to send a secret message to a receiver, which one of the following statements is true?

a. Sender encrypts using his own public key
b. Receiver decrypts using his own public key
c. Sender encrypts using receiver's public key
d. Receiver decrypts using sender's public key

44) If everyone in a group of N people want to communicate secretly with the N – 1 others using symmetric key cryptographic system and the communication between any two persons should not be decodable by the others in the group, then what is the number of keys required in the system as a whole to satisfy the confidentiality requirement?

a. N(N-1)
b. N(N-1) / 2
c. 2N
d. $(N-1)^2$

45) Internetwork is made of five networks. Which are those?

a. Four LANs and One MAN
b. Four LANs and One WAN
c. Three LANs and Two WAN
d. Four MANs and One WAN

46) This is one of two protocols that let a network administrator supervise and distribute IP addresses from a central point. It automatically sends a new IP address when a computer is plugged into a different place in the network.

a. UDP
b. TCP
c. TCPMAN
d. DHCP

47) A sender B sends a message m to receiver A, which is digitally signed by B with its private key. In this scenario, one or more of the following security violations can take place.

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5

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21 B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Code and Title : 10211EC110 – DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	CGPA
Slot:S6		**Course Handling Faculty :** Dr. Mariya Celin TA		
1.	VTU22382	MOPURI DEEPESH PAVAN REDDY	A	9.5
2.	VTU23741	YARRAGOLLA VENKATA SAI	A	9.54
3.	VTU23559	G SAHITHI	A	9.0
4.	VTU24177	A.VISHNU SREE PAVAN KOTESH	A	9.16

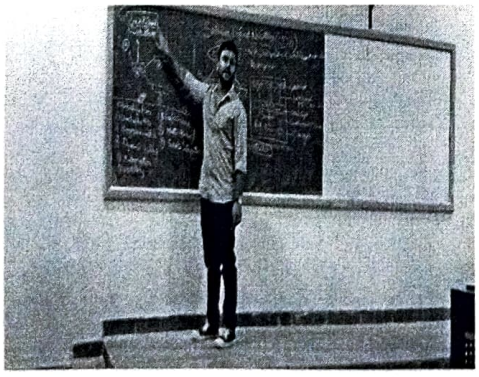
Training / Activities Conducted for fast learners

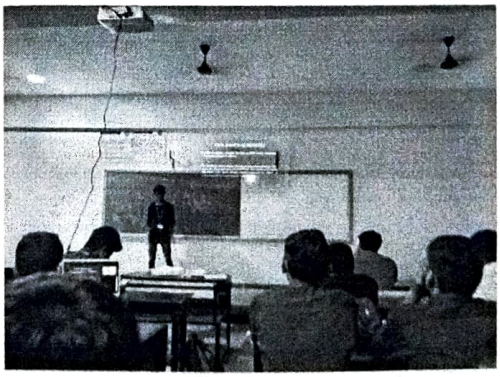
- Advised the students to participate in workshop/project presentation/paper presentation/Seminar presentation/ technical events for better understanding of the recent technological upgrades.
- To motivate them on that note, they were asked to give seminar presentation on the topics related to the syllabus and recent trends in networking to the class.

Improvement/ Achievement of fast learners

- Performance of the students in CIA Test was Improved.
- The students felt motivated by the seminars.
- They have attended workshops on LoRA workshop related to networking.

Proof of their seminar presentation on recent trends in networking





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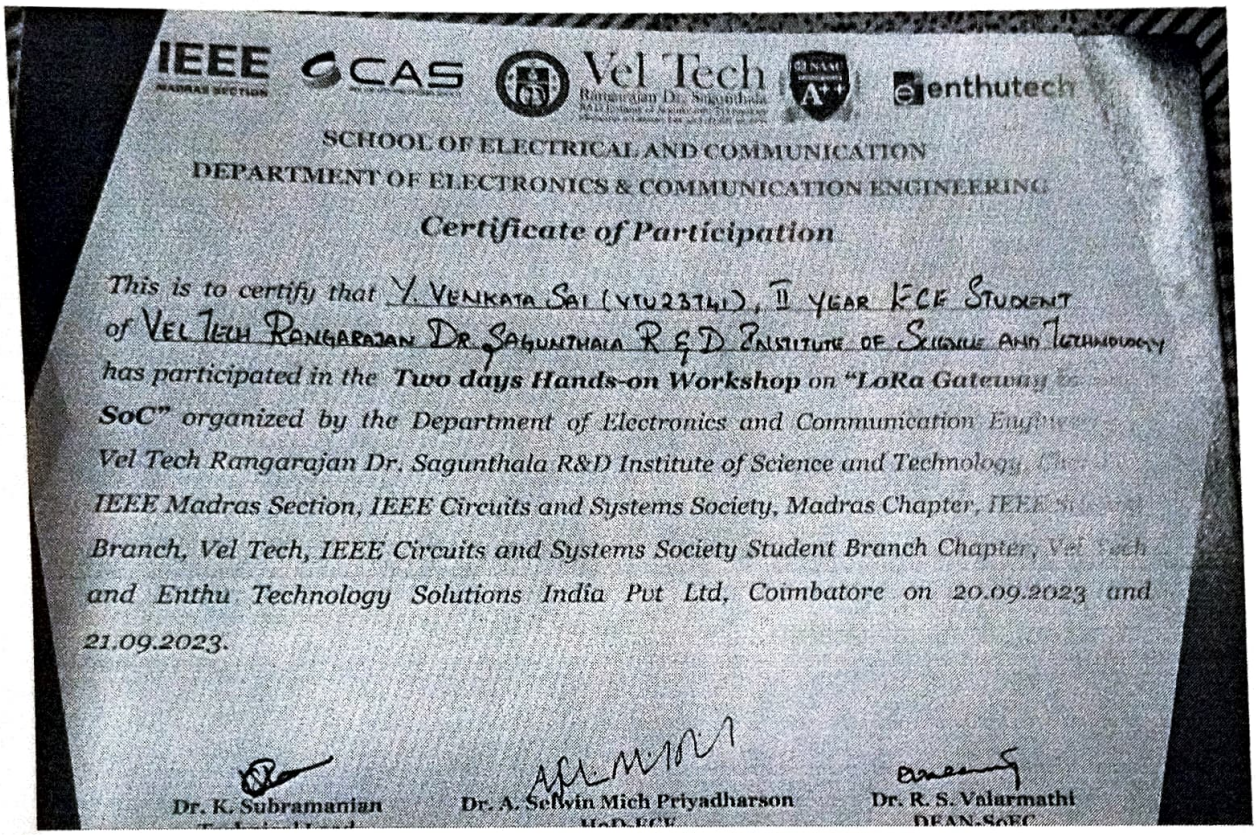
Certificate of Student on attending LoRA workshop



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that Y. VENKATA SAI (VTU23741), II YEAR ECE STUDENT *of* VEL TECH RANGARAJAN DR. SAGUNTHALA R&D INSTITUTE OF SCIENCE AND TECHNOLOGY *has participated in the* ***Two days Hands-on Workshop*** *on* ***"LoRa Gateway to SoC"*** *organized by the Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.*

Dr. K. Subramanian — Dr. A. Selwin Mich Priyadharson, HoD-ECE — Dr. R. S. Valarmathi, DEAN-SoEC

Faculty In-charge | **Course Coordinator** | **HOD / ECE**

5

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : S7		Course Handling Faculty : Dr. Nalini.N		
1.	VTU22176	KORUMILLI SAI SAMPATH	9.11	29

Training / Activities Conducted for fast learners

- Provided GATE sample question papers related to Data Communication Networks.

Criteria for fast learners: CGPA 8.5 and Test 1 greater than 25 marks

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : S3		**Course Handling Faculty :** Dr.Helina Rajini Suresh		
1.	VTU22443	KAPA RAKESH REDDY	8.7	24
2.	VTU23315	MALE INDRA SHEKAR REDDY	8.6	28
3.	VTU26968	JINKALA MANI KANTA REDDY	Lateral Entry	27
4.	VTU27102	PALADUGU HARIKA	Lateral Entry	27
5.	VTU27110	A N HARSHINI	Lateral Entry	27.5

Training / Activities Conducted for fast learners

- Seminar given

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Performance improved in Test II and Test III.

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		**Course Handling Faculty :** Dr.K.E.Purushothaman		
		Nil		

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

K.E.Purushothaman
Faculty Signature

Course Coordinator

HOD/ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		Course Handling Faculty : Dr. Vignesh Prasanna N		
1	NIL			
2				
3				
4				

Training / Activities Conducted for fast learners

Nil

Improvement/ Achievement of fast learners

Nil

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 & Linear Integrated Circuits

Course Coordinator : Dr.Vignesh Prasanna.N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		**Course Handling Faculty :** Dr.R.Nanmaran		
		Nil		

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

Faculty Signature

Course Coordinator

HOD/ ECE

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC104 / Linear Integrated Circuits

Course Coordinator : Dr. Vignesh Prasanna N

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		**Course Handling Faculty : Dr. Rahul S G**		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.6	28.5
2	VTU23099	P S DINESH KUMAR	9.2	27.5
3	VTU23559	G SAHITHI	9.0	28
4	VTU23626	KOTIPALLI V S SUBRAHMANYESWARI	9.6	28.5
5	VTU23650	SURA RAKESH REDDY	9.67	25
6	VTU23741	YARRAGOLLA VENKATA SAI	9.5	27.5
7	VTU24177	ADURI VISHNU SREE PAVAN KOTESH	9.1	27.5

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Encouraged to develop their technical and teamwork skills by participating in various IEEE Student Chapters and Department Club events.
- Motivated them to participate in workshops.

Improvement/ Achievement of fast learners

Few students enrolled themselves in IEEE Student Branch Chapters and participated in workshops.

Faculty **Course Coordinator** **HoD**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that A. Vishnu [VTU24177), II Year, ECE Student, *of* Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science And Technology *has participated in the* ***Two days Hands-on Workshop*** *on* ***"LoRa Gateway based SoC"*** *organized by the Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.*

Dr. A. Selwin Mich Priyadharson
HoD-ECE

Dr. R. S. Valarmathi
DEAN-SoEC

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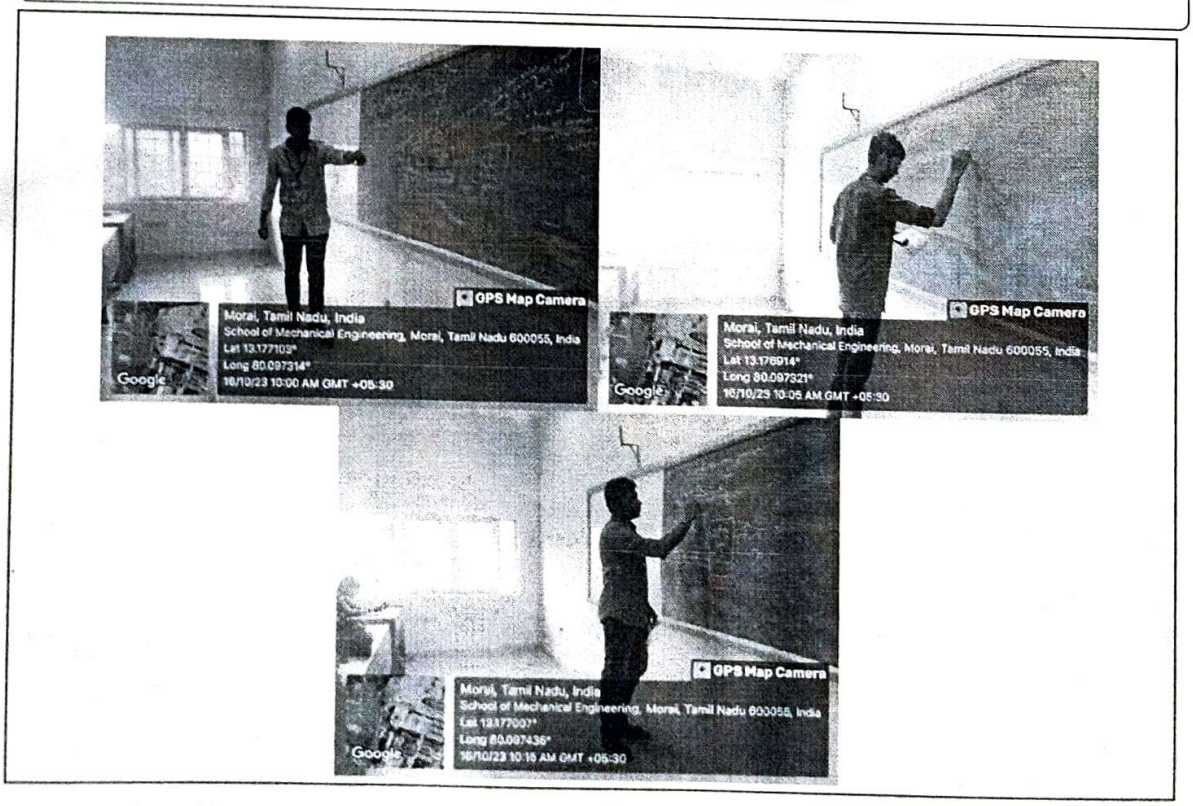
SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Title: **Linear Integrated Circuits**
Date after Test-1: **16/10/2023**
Academic Year: **2023 - 2024**
Course Code:**10211EC104**
Course Coordinator: **Dr.Vignesh Prasanna N**
Semester: **Summer**
Course Handling Faculty: **Dr.Bikash Ranjan Behera (Section J)**

Sl.No.	VTU No.	Name of the Student	Performance of The Student	
			Test 1	Category
1.	21963	CHENNU VENKATESWARA RAO	30	A
2.	26988	PARIMI NAGA SAI RAM	29	A
3.	27030	KANDUKURI YOGINI RAMA	29	A

Action Planned: To motivate the other classmates and improve the class learning environment, the fast learners needed to shared their approach towards solving the questions (theory as well as problems) related to the course contents, where, a seminar-type presentation to be conducted regularly to encourage discussion sessions among the fellow students.



Course Handling Faculty

Course Coordinator

HOD ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B. TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

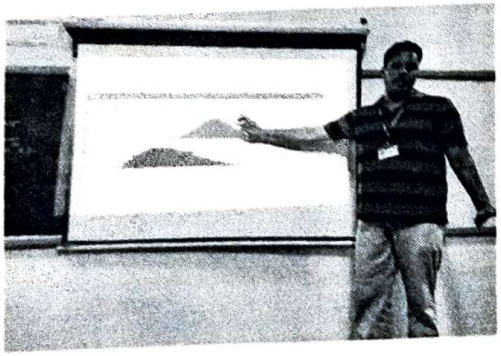
Course Code and Title :10211EC110/Data Communication Networks

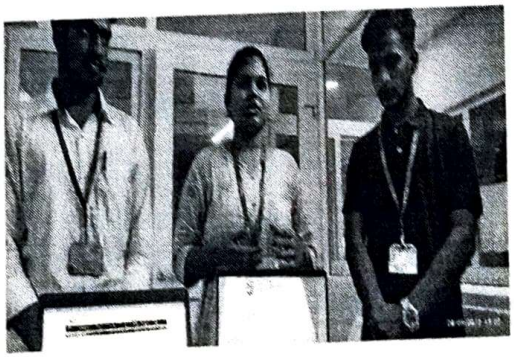
Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty :Dr.D.David Neels Ponkumar**		
1	VTU21844	KAMABATHULA PAVAN TEJA	9.5	28
2	VTU22856	MANISHA A	8.6	28
3	VTU23711	MYLAMURU LAKSHMI PRASANNA	8.9	29
4	VTU21752	GRANDISILA POORNA CHAITANYA	9.3	29
5	VTU22812	KOLLA MOHAN	8.9	29

Training / Activities Conducted for fast learners

- Students were encouraged to do Seminars.





Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

It improved their presentation skills and removed stage fear. It will equip them for placement.

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC110/ Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty :** Dr.K.Aanandha Saravanan		
Nil				

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners
-

Improvement/ Achievement of fast learners
-

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTU R21 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 – Data Communication Networks

Category: Program Core

Course Coordinator : Dr.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance in Test- 1 CIA	Category
Slot: S3		Course Handling Faculty :Mrs.C Ambika Bhuvaneswari		
1.	VTU23626	KOTIPALLI V S SUBRAHMANYESWARI	30	9.1

Training / Activities Conducted for fast learners

1. Encouraged the Students to take up Koggle data Contest.
2. Advised the students to register and learn professional coding in Upgrade, Great learning etc., and to participate in advanced learning.

Criteria for fast learners: Test 1 greater than 25 with CGPA of 8.5

Improvement/ Achievement of fast learners

1. They can start their own project work in their academics

Faculty Signature **CC Signature** **HOD Signature**

IEEE

Certificate of Participation

This is to certify that

VALLI SRI SUBRAHMANYESWARI KOTIPALLI

From team Rangers Participated in IEEEXtreme 17.0 Programming

Competition that Hosted +17,000 Participants

29th October 2023

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THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. FOUNDED NEW YORK 1884

Saifur Rahman

IEEE President 2023

IEEE MADRAS SECTION | CAS CIRCUITS AND SYSTEMS SOCIETY | Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology (Deemed to be University Estd. u/s 3 of UGC Act, 1956) | NAAC A++ | enthutech

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that VALLI SRI SUBRAHMANYESWARI (VTU 29626), II Year ECE Student, *of* Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology *has participated in the* ***Two days Hands-on Workshop on "LoRa Gateway based SoC"*** *organized by the Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.*

Dr. K. Subramanian
Technical Lead
Enthu Technology Solutions

Dr. A. Selwin Mich Priyadharson
HoD-ECE

Dr. R. S. Valarmathi
DEAN-SoEC

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : E		**Course Handling Faculty : Dr. Dasari Naga Vinod**		
1.	VTU22084	PILLARAM NEHA REDDY	9.6	26
2.	VTU22746	CHAPPATI PADMA PRIYA	8.9	26
3.	VTU23761	GUGGILLA JEEVARATHNAM	8.6	26
4.	VTU21520	KARPURAPU HANISHKA	9.1	26

Training / Activities Conducted for fast learners

- Provided GATE sample question papers related to Data Communication Networks.

Criteria for fast learners: CGPA 8.5 and Test 1 greater than 25 marks

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

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Computer Networks GATE Questions

Computer Networks is an exciting topic covered by the GATE CSE Question Paper. The candidates are also advised to solve and practise these Computer Networks GATE questions. Some of the main concepts that constitute the Computer Networks GATE questions with answers PDF are Data Link Layer, IP Addressing, Network Security and more. Candidates are also advised to refer to the collection of GATE Questions Computer Networks that we have listed here in this article below.

Computer Network is an important topic covered in the GATE CSE question paper. Candidates can refer to these Computer Network Questions for GATE to get the best results. Solving these questions will help the candidates to prepare more proficiently for the GATE exams. Candidates can first solve these questions and then refer back to the answers to gauge their performance. Meanwhile, candidates can find the Computer Networks GATE Question with Answers in this article below. They can also refer to these GATE previous year question papers (https://byjus.com/gate/previous-year-question-papers/) and start preparing for the exams.

Note: *We shall be updating the answers/ solutions for these questions soon.*

Computer Network GATE Questions with Solutions

From The Computer Network Topic of the GATE CSE Question Paper

MCQ – Single Answer Computer Networks GATE Questions

1) What is the protocol data unit (PDU) for the application layer in the Internet stack?

a. Frame

b. Datagram

c. Segment

d. Message

2) Which among this is not a client-server application?

a. Ping

b. Web-browsing

c. Internet Chat

d. Email

3) If an Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it:245.248.128.0/20 and the ISP wants to give half of this chunk of address to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Then, which among the following is a valid allocation of addresses to A and B?

a. 245.248.132.0/22 and 245.248.132.0/21

b. 245.248.136.0/21 and 245.248.128.0/22

c. 245.248.128.0/21 and 245.248.128.0/22

d. 245.248.136.0/22 and 245.248.132.0/21

4) The pairs of OSI protocol layer/sub-layer and its functionality are given below, the INCORRECT pair from among these are:

a. Data Link Layer and Bit synchronization
b. Network Layer and Routing
c. Medium Access Control sub-layer and Channel sharing
d. Transport Layer and End-to-end process communication

Hi there! Got any questions? I can help you...

5) A firewall is installed at the point where the secure internal network and untrusted external network meet, which is also known as_____

a. Secure point

b. Meeting point
c. Chock point
d. Firewall point

6) What does DHCP stand for?

a. Dynamic Host Configuration Protocol
b. Dynamic Host Configuration Provider
c. Digital Host Communication Provider
d. Digital Host Communication Protocol

7) The growth of congestion window occurs_____

a. Infinitely
b. Up to timeout
c. Up to threshold
d. Up to the size of receiver's window

8) When was Aloha developed?

a. In 1990
b. In 1980
c. In 1970
d. In 1960

9) Which of these is a Transmission media that can be used in LAN?

a. fibre optics
b. coaxial cable
c. microwave
d. satellite

10) Which of these protocols given below uses UDP as transport protocol?

a. DNS
b. Telnet
c. HTTP
d. SMTP

11) LANs can be connected by a device known as _____

a. Ethernet card
b. Modems
c. Routers
d. Bridges

12) What is the bit rate in Ethernet when Manchester encoding is used?

a. Same as the baud rate
b. Twice the baud rate
c. Half the baud rate
d. None of these

13) What is slot time for gigabit Ethernet?

a. 0.612
b. 0.512
c. 0.412
d. 0.312

14) Radio waves are _____

a. directional
b. bidirectional
c. omnidirectional
d. unidirectional

15) The term that refers to the shortest unit and carries data elements is_____

a. Single element
b. Data carrier
c. Signal element
d. Both b and c

16) Which architecture is FTP built on?

a. P2P
b. Client-server
c. Both the above
d. None of these

17) What is the address resolution protocol (ARP) used for?

a. Finding the IP address of the default gateway
b. Finding the MAC address that corresponds to an IP address
c. Finding the IP address that corresponds to a MAC address
d. Finding the IP address from the DNS

Which of the following are not true characteristics of NetBEUI?

a. Fast for small networks to Self-tuning
b. Little configuration required
c. Routable
d. Highly customizable

) Identify the correct option for the given assertion and reason

ssertion: In IEEE 802.3 is not suitable for client server application

eason: In Ethernet, there is a restriction on minimum size.

. Assertion and Reason, both are true

. Assertion and reason are false

. Assertion is true and reason is false

d. Assertion and reason are true, but this is not the correct reason for the given assertion

20) Consider that a computer on a 10Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 2Mbps. It is initially filled to capacity with 16 Megabits. What is the maximum duration for which the computer can transmit at the full 10Mbps?

a. 8 seconds
b. 5 seconds
c. 2 seconds
d. 1.6 seconds

21) In Unicast Routing, we use shortest path tree method for finding shortest path of the_____

a. Nodes
b. Networks
c. Packets
d. Frames

22) Which is the network that provides high speed connectivity?

a. Internetwork
b. WAN
c. LAN
d. MAN

23) What is the maximum number of subnets and the maximum number of hosts in each subnet, if the address of a class B host is to be split into subnets with a 6-bit subnet number?

a. 64 subnets and 262142 hosts

b.62 subnets and 262142 hosts

c. 64 subnets and 1024 hosts

d. 62 subnets and 1022 hosts

24) Which of the following statements about HTTP are false?

a. HTTP describe the structure of web page
b. HTTP run over TCP
c. HTTP can be used to test the validity of hyper link test
d. HTTP allows information to be stored in url

25) What is an anticipated result from multi programming operations?

a. Handling of more jobs
b. Reduced computer idle time
c. Better scheduling of work
d. All of the above

26) What is the Network, in which every computer is capable of playing the role of client, server or both at the same time?

a. dedicated server network
b. local area network
c. wide area network
d. peer-to-peer network

27) Match the following:

(P) SMTP	(1) Application layer
(Q) BGP	(2) Transport layer
(R) TCP	(3) Data link layer
(S) PPP	(4) Network layer
	(5) Physical layer

(a) P – 2 Q – 1 R – 3 S – 5

(b) P – 1 Q – 4 R – 2 S – 5

Hi there! Got any questions? I can help you...

(c) P - 1 Q - 4 R - 2 S - 3

(d) P - 2 Q - 4 R - 1 S - 3

28) If a CSMA/CD network that transmits data at a rate of 100 Mbps (10^8 bits second) over a 1 km(kilometer) cable with no repeaters and the minimum frame size required for this network is 1250 bytes, what is the signal speed (km/sec) in the cable?

a. 16000
b. 20000
c. 10000
d. 8000

29) One of the header fields in an IP datagram is the Time to Live (TTL) field. Which of these below given statements best explains the need for this field?

(a) It can be used to reduce delays

(b) It can be used to optimize throughput

(c) It can be used to prioritize packets

(d) It can be used to prevent packet looping

30) A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide, and A wins the first back off race. At the end of this successful transmission by A, both A and B attempt to transmit and collide. The probability that A wins the second back off race is____

a. 0.625
b. 0.75
c. 0.5
d. 1.0

31) In a packet switching network, packets are routed from source to destination along a single path having two intermediate nodes. If the message size is 24 bytes and each packet contains a header of 3 bytes, then what is the optimum packet size?

a. 4
b. 6
c. 7
d. 9

32) Station B needs to send a message consisting of 9 packets to Station C using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that B transmits gets lost (but no acks from C ever get lost), then what is the number of packets that B will transmit for sending the message to C?

a. 14
b. 16
c. 12
d. 18

33) Which of the following assertions about the Internet Protocol (IP) is False?

a. IP Packets from the same source to the same destination can take different routes in the network
b. The packet source cannot set the route of an ongoing packets; the route is only determined by the routing tables in the routers on the way
c. IP ensures that a packet is discarded if it is unable to reach its destination within a given number of hops
d. It is possible for a computer to have multiple IP addresses

34) For an organization that has a class B network and wishes to form subnets for 64 departments, what will the subnet mask be?

a. 255.255.64.0
b. 255.255.64.0
c. 255.255.128.0
d. 255.255.252.0

35) The message 11001001 is to be transmitted using the CRC polynomial x^3 + 1 to protect it from errors. The message that should be transmitted is_____

a. 11001001011

b. 11001001000

c. 110010010011

d. 11001010

36) If two computers C_1 and C_2 are configured as follows and C_1 has IP address 203.197.2.53 and netmask 255.255.128.0, while C_2 has IP address 203.197.75.201 and netmask 255.255.192.0, then which of the following statements is true?

a. C_2 assumes C_1 is on the same network, but C_1 assumes C_2 is on a different network
b. C_1 assumes C_2 is on the same network, but C_2 assumes C_1 is on a different network
c. C_1 and C_2 both assume they are on different networks
d. C_1 and C_2 both assume they are on the same networks

37) Look at these three statements about link state and distance vector routing protocols, for a large network with 500 network nodes and 4000 links

[S_1] The computational overhead in link state protocols is higher than in distance vector protocols.

[S_2] A distance vector protocol (with split horizon) avoids persistent routing loops, but not a link state protocol.

[S_3] After a topology change, a link state protocol will converge faster than a distance vector protocol.

ch one of the following is correct about S_1, S_2, and S_3?

a. S_1, S_2, and S_3 are all false
b. S_1, S_2, and S_3 are all true
c. S_1 and S_2 are true, but S_3 is false
d. S_1 and S_3 are true, but S_2 is false

Which of these functionalities should be implemented by a transport protocol over and above the network otocol?

a. Detection of duplicate packets
b. End to end connectivity
c. Packet delivery in the correct order
d. Recovery from packet losses

39) If the length of a Broadcast LAN is 2 Km and it has 107 bps bandwidth and uses CSMA/CD and the signal travels along the wire at 2108m/s, then what is the minimum size of the packet?

a. 100 bytes
b. 200 bytes
c. 50 bytes
d. None of these

40) Which is one of the pairs of protocols given below from both the protocols that can use multiple TCP connections between the same client and the server?

a. HTTP, TELNET
b. HTTP, SMTP
c. FTP, SMTP
d. HTTP, FTP

41) What is the number of 8-bit characters that can be transmitted per second over a 9600 baud serial communication link that use asynchronous mode of transmission with 8 data bits, one start bit and one parity bit?

a. 800
b. 600
c. 876
d. 1200

42) In the starting phase of TCP congestion control algorithm size of congestion control window_____

a. Increase Linearly
b. Does not increase
c. Increase exponentially
d. Increase

43) If a sender is employing public key Cryptography to send a secret message to a receiver, which one of the following statements is true?

a. Sender encrypts using his own public key
b. Receiver decrypts using his own public key
c. Sender encrypts using receiver's public key
d. Receiver decrypts using sender's public key

44) If everyone in a group of N people want to communicate secretly with the N – 1 others using symmetric key cryptographic system and the communication between any two persons should not be decodable by the others in the group, then what is the number of keys required in the system as a whole to satisfy the confidentiality requirement?

a. N(N-1)
b. N(N-1) / 2
c. 2N
d. $(N-1)^2$

45) Internetwork is made of five networks. Which are those?

a. Four LANs and One MAN
b. Four LANs and One WAN
c. Three LANs and Two WAN
d. Four MANs and One WAN

46) This is one of two protocols that let a network administrator supervise and distribute IP addresses from a central point. It automatically sends a new IP address when a computer is plugged into a different place in the network.

a. UDP
b. TCP
c. TCPMAN
d. DHCP

Hi there! Got any questions? I can help you.

47) A sender B sends a message m to receiver A, which is digitally signed by B with its private key. In this scenario, one or more of the following security violations can take place.

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5

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21 B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Code and Title : 10211EC110 – DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	CGPA
Slot:S6		**Course Handling Faculty :** Dr. Mariya Celin TA		
1.	VTU22382	MOPURI DEEPESH PAVAN REDDY	A	9.5
2.	VTU23741	YARRAGOLLA VENKATA SAI	A	9.54
3.	VTU23559	G SAHITHI	A	9.0
4.	VTU24177	A.VISHNU SREE PAVAN KOTESH	A	9.16

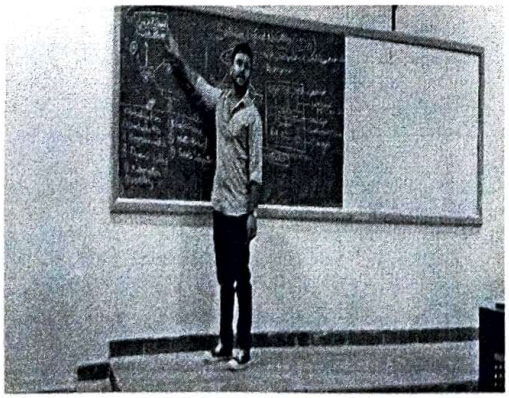
Training / Activities Conducted for fast learners

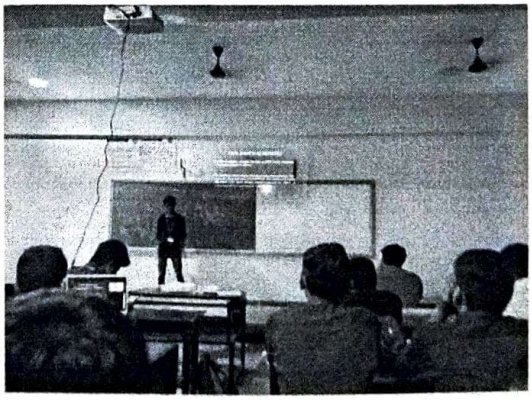
- Advised the students to participate in workshop/project presentation/paper presentation/Seminar presentation/ technical events for better understanding of the recent technological upgrades.
- To motivate them on that note, they were asked to give seminar presentation on the topics related to the syllabus and recent trends in networking to the class.

Improvement/ Achievement of fast learners

- Performance of the students in CIA Test was Improved.
- The students felt motivated by the seminars.
- They have attended workshops on LoRA workshop related to networking.

Proof of their seminar presentation on recent trends in networking





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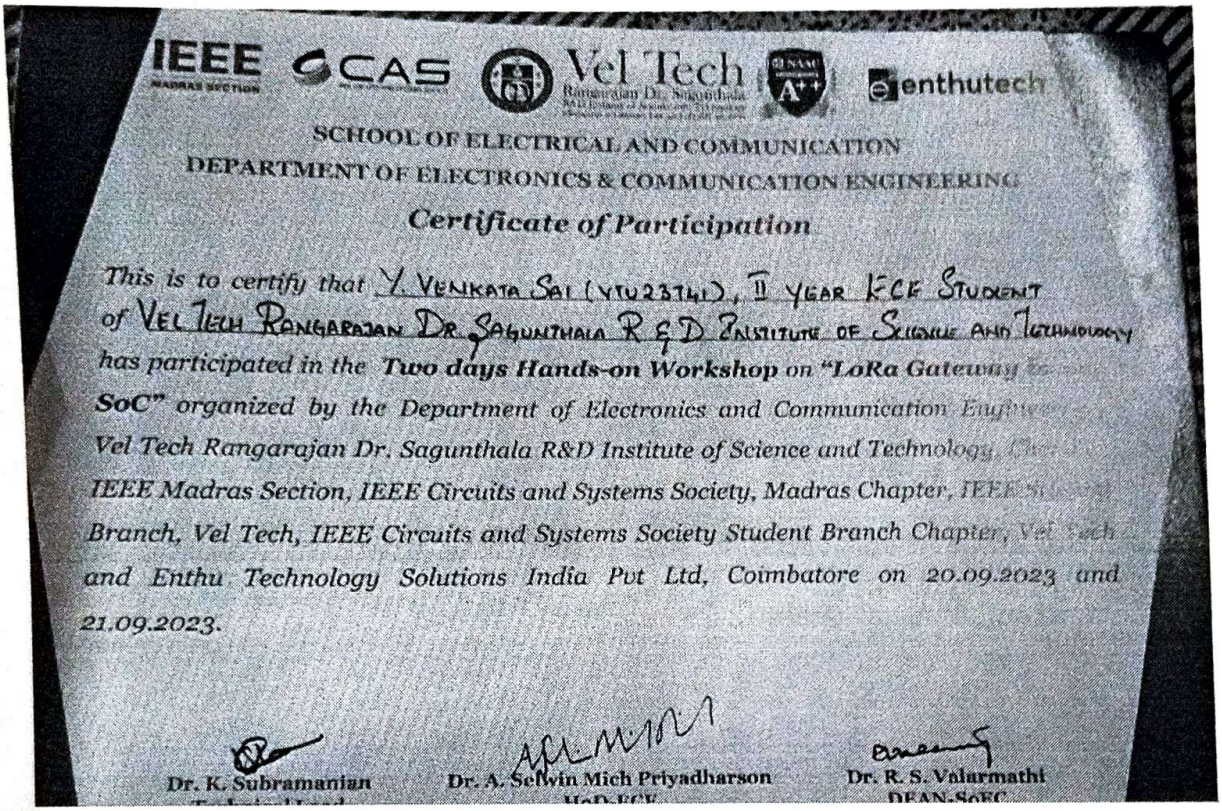
Certificate of Student on attending LoRA workshop



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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that Y. VENKATA SAI (VTU23741), II YEAR ECE STUDENT *of* VEL TECH RANGARAJAN DR. SAGUNTHALA R&D INSTITUTE OF SCIENCE AND TECHNOLOGY *has participated in the* ***Two days Hands-on Workshop*** *on* ***"LoRa Gateway SoC"*** *organized by the Department of Electronics and Communication Engg., Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.*

Dr. K. Subramanian — Dr. A. Selwin Mich Priyadharson, HoD-ECE — Dr. R. S. Valarmathi, DEAN-SoEC

Faculty In-charge **Course Coordinator** **HOD / ECE**

5

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & DATA COMMUNICATION NETWORKS

Course Coordinator : Dr. David Neels Pon Kumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : S7		Course Handling Faculty : Dr. Nalini.N		
1.	VTU22176	KORUMILLI SAI SAMPATH	9.11	29

Training / Activities Conducted for fast learners

- Provided GATE sample question papers related to Data Communication Networks.

Criteria for fast learners: CGPA 8.5 and Test 1 greater than 25 marks

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC110 & Data Communication Networks

Course Coordinator : Dr.D.David Neels Ponkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : S3		Course Handling Faculty : Dr.Helina Rajini Suresh		
1.	VTU22443	KAPA RAKESH REDDY	8.7	24
2.	VTU23315	MALE INDRA SHEKAR REDDY	8.6	28
3.	VTU26968	JINKALA MANI KANTA REDDY	Lateral Entry	27
4.	VTU27102	PALADUGU HARIKA	Lateral Entry	27
5.	VTU27110	A N HARSHINI	Lateral Entry	27.5

Training / Activities Conducted for fast learners

- Seminar given

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Performance improved in Test II and Test III.

Faculty Signature **CC Signature** **HOD Signature**

— b)

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE – 2021 B.TECH-ECE

SUMMER 2023-24

List of Fast Learners – Action Taken Report

Faculty Name : Dr.Arun.C.A **TTS Number**: 2913
Course Title & Course Code : Discrete Time Signal Processing & 10211EC111
Semester : Summer Semester
Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		Course Handling Faculty : Dr S Jana		
1	VTU20150	NARRA BALAJI	9.1	29
2	VTU20862	ADITYA SHARMA	9.0	28
3	VTU24029	DRONADULA SAI SIVA GANESH	8.6	26

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Training / Activities Conducted for fast learners

- Motivated to solve GATE questions on signal processing
- MATLAB Courses are advised to take on following topics signal processing, image processing, machine learning and deep learning

Improvement / Achievement of fast learners

The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions

Faculty Signature | Course Coordinator | HOD Signature

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VTR UGE 21B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Taken Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr.S. Jana

S. No	VTU No.	Name of the Student	Outcome
Section: C		**Course Handling faculty: Dr. R Rajkumar**	
1.	VTU20903	AKULA LOKESH	• Students completed MATLAB Onramp. • Completed AICTE online Internship
2.	VTU20908	BALPUNURI SAKETH REDDY	
3.	VTU23960	MADITHATI SIVA CHANDRA LEKHA	
4.	VTU24010	KATAMREDDY POOJITHA REDDY	

Faculty In-Charge **Course Coordinator** **HOD / ECE**

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DEPARTMENT OF ECE
VTR UGE 21 B.TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr. Jana S

S.No	VTU No.	Name of the Student	Performance of the Student		
			Category	Test 1	CGPA
Section : C		**Course Handling Faculty :** Dr. R.Rajkumar			
1.	VTU20903	AKULA LOKESH	A	28	8.7
2.	VTU20908	BALPUNURI SAKETH REDDY	A	28.5	8.9
3.	VTU23960	MADITHATI SIVA CHANDRA LEKHA	A	27.5	8.85
4.	VTU24010	KATAMREDDY POOJITHA REDDY	A	26	8.9

Training / Activities Conducted for fast learners

- Motivated the students to completed MATLAB onramp certification.
- Motivated to participate in AICTE online internship program.
- Motivated them to participate in co-curricular activities.

Improvement/ Achievement of fast learners

Students completed

- On ramp certification from MATLAB
- Received online internship certification from AICTE

Faculty In-charge **Course Coordinator** **HOD / ECE**

AICTE

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National Educational Alliance for Technology

AICTE - MathWorks 2023 VIRTUAL INTERNSHIP

Virtual Internship Completion Certificate

This is to certify that

Saketh Reddy Balpunuri

Veltech University

has successfully completed

MathWorks Virtual Internship Program on

'Get started with Artificial Intelligence' during

May - September 2023

Supported by MathWorks

Dr. Buddha Chandrasekhar
Chief Co-ordinating Officer (CCO)
NEAT Cell, AICTE

Chandan Pramanik
Director, Education
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b

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Fast Learners – Action Planned Report

Course Code and Title :10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : D		Course Handling Faculty :Dr C. Raja		
1.	VTU21322	KUNCHALA NARAYANA RAO	A	25
2.	VTU21210	RAJAN RISHAV	A	25.5
3.	VTU21216	TONDEPU RAMYA	A	25

Training / Activities Conducted for fast learners

Motivated students to do additional exercise based on MATLAB, Motivated students to prepare Gate Questions,

Improvement / Achievement of fast learners

Few students have shown MATLAB based assignments

Faculty

(Dr. C. RAJA)

Course Coordinator

HOD Sign

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Ex-5

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024
Fast Learners – Action Taken:: Additional Lab Experiment

Course Code and Title :10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Experiment Name: Fast Fourier Transform (FFT) CO1 K3

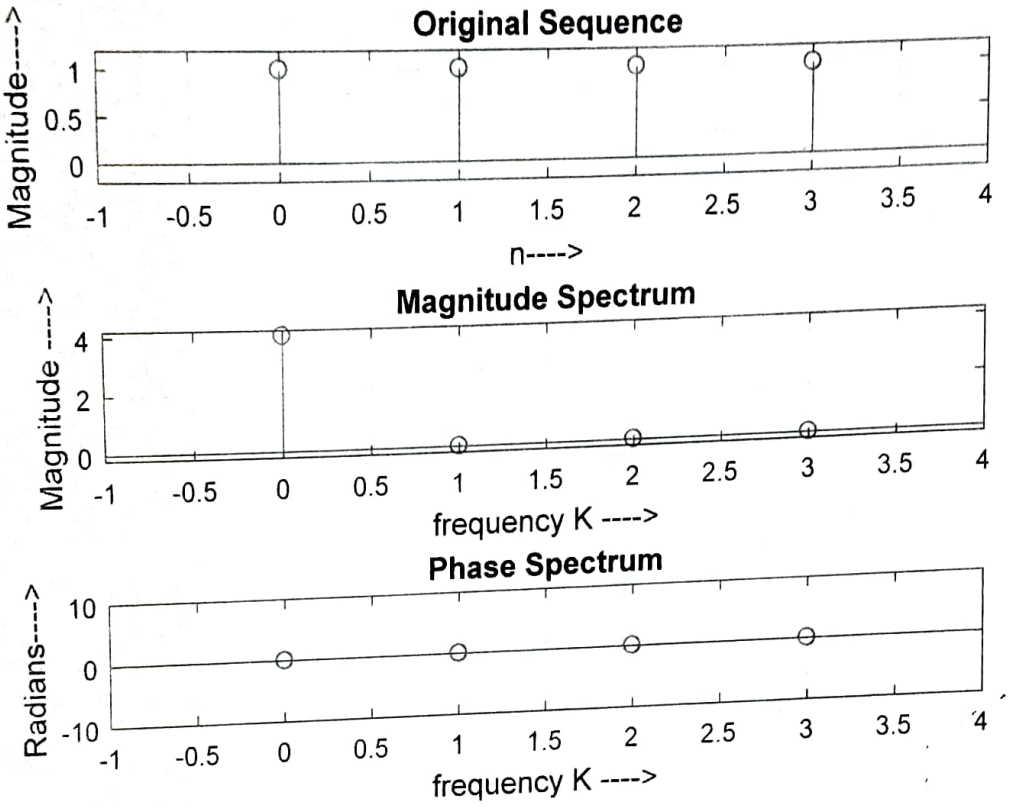
- **Task 1:** Perform the tasks given in Ex1 and Ex2 using Matlabfft function
- **Task 2 :**Consider a DT signal ; corrupted by noise. It is desired to filter the noise using fft algorithm.

Computing 4 point FFT

- clear all; close all; clc;

```
% Case1:N = 4;
x = [1,1,1,1];
N = 4;
n = 0:N-1;          % Time axis
X = fft(x,N);
k = 0:N-1;          % Frequency axis
magX = abs(X); phaX = angle(X)*180/pi;
subplot(3,1,1); stem(n,x); grid
xlabel('n---->'); ylabel('Magnitude---->');
title('Original Sequence');
axis([-1 N -0.2 1.2]);
% Plot the frequency response
subplot(3,1,2); stem(k,magX); grid
xlabel('frequency K ---->'); ylabel('Magnitude ---->') ;
title('Magnitude Spectrum');
axis([-1 N -0.2 4.2]);

subplot(3,1,3); stem(k,phaX); grid
xlabel('frequency K ---->');  ylabel('Radians---->');
title('Phase Spectrum');
axis([-1 N  min(phaX)-10 max(phaX)+10]);
```



Adding Noise

```
n = 0:255;
x = n.*exp(-0.03*n); % desired signal
y = x + randn(size(x)); % noisy signal

X = fft(x);
Y = fft(y);

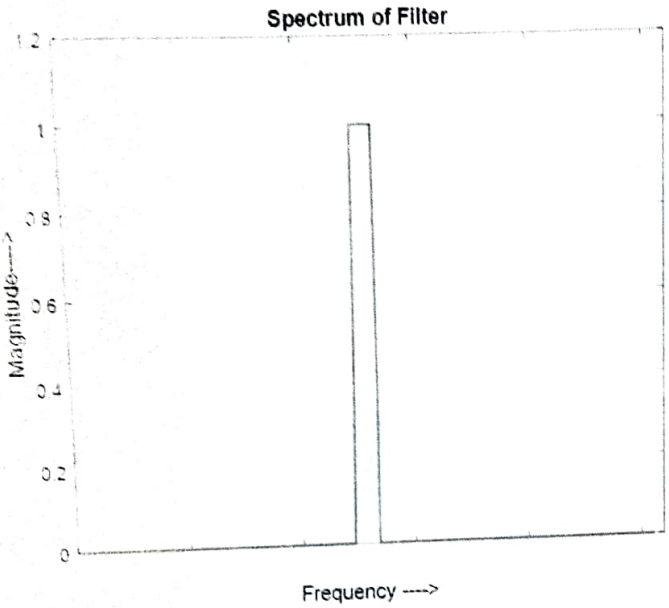
figure(2);subplot(3,1,1);plot(fftshift(abs(X)),'r','LineWidth',1.5 );
%fftshift(X) rearranges a Fourier transform X by shifting the
%zero-frequency component to the center of the array.
xlabel('Frequency ---->'); ylabel('Magnitude---->');
title('Spectrum of Original Signal');
axis([0 260 0 1200]);

subplot(3,1,2);plot(fftshift(abs(Y)),'k','LineWidth',1.5 );
xlabel('Frequency ---->'); ylabel('Magnitude---->');
title('Spectrum of Noisy Signal');
axis([0 260 0 1200]);
```

Filter Transfer function

```
H = [ones(1,5) zeros(1,246), ones(1,5)]; % the filter response

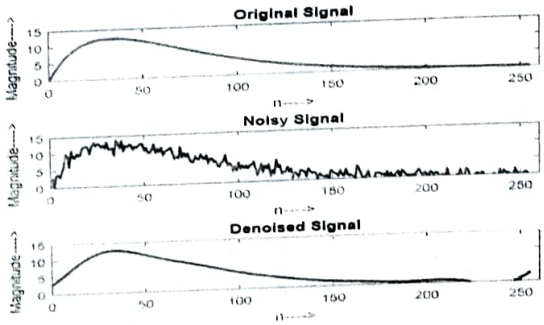
figure(3);
plot(fftshift(H),'m','LineWidth',1.5);
xlabel('Frequency ---->'); ylabel('Magnitude---->');
title('Spectrum of Filter');
axis([0 260 0 1.2]);
```



Filtering in FD

```
Z = Y.*H; % filter in frequency domain
z = ifft(Z);
figure(1);subplot(3,1,3);plot(n, real(z),'b','LineWidth',1.5);
xlabel('n---->'); ylabel('Magnitude---->');
title('Denoised Signal'); axis([0 260 0 15]);
axis([0 260 0 15]);

p = fft(z);
figure(2);
subplot(3,1,3);plot(fftshift(abs(p)),'k','LineWidth',1.5 );
xlabel('Frequency ---->'); ylabel('Magnitude---->');
title('Spectrum of Denoised Signal');
axis([0 260 0 1200]);
```



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SUMMER 2023 – 2024

List of Fast Learners – Action Planned Report

Course Code and Title : 10211EC111 – DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr. JANA. S

S.No	VTU No.	Name of the Student		Performance of the Student	
			Category	Test 1	CGPA
Section : E		**Course Handling Faculty :** Dr. KOUSHICK VENKATESH			
1.	VTU21007	Priyansi	A	28	9.1
2.	VTU21147	Mohammed Saad Farees	A	25	8.51
3.	VTU21140	B Vishnu Vardhan Reddy	A	28	8.56
4.	VTU21108	Khusbhu Kumari	A	25	8.48
5.	VTU20938	Putturu Sai Mokshitha	A	29	8.8

Training / Activities Conducted for fast learners

- Advised the students to participate in workshop/project presentation/paper presentation/Seminar presentation/ technical events for better understanding of the recent technological upgrades.
- Planned to give important questions and tips to solve and get the valid score in GATE Examination.
- Planned to give real-time problems and motivated them to participate in SIH 2023.

Improvement / Achievement of fast learners

- Motivated them to participate in Smart India Hackathon Contest 2023.
- Motivated them to participate in GATE 2024.

Faculty In-charge **Course Coordinator** **HOD / ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21 B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Taken Report

Course Code and Title : 10211EC111 – Discrete Time Signal Processing

Course Coordinator : Dr. S. Jana

S. No	VTU No.	Name of the Student	Performance in Quiz (GATE Qns.) Marks
Section: E		**Course Handling faculty: Dr. Koushick Venkatesh**	
1.	VTU21007	Priyansi	20 / 20
2.	VTU21147	Mohammed Saad Farees	02 / 20
3.	VTU21140	B Vishnu Vardhan Reddy	14 / 20
4.	VTU21108	Khusbhu Kumari	14 / 20
5.	VTU20938	Putturu Sai Mokshitha	16 / 20

Faculty In-Charge

Course Coordinator

HOD / ECE

Section - E

10211EC111 - DTSP (GATE Qns) - Advanced Learners

Attend all the Questions. Each Questions carries 2 Marks.

koushickv@veltech.edu.in Switch account

* Indicates required question

Email *

Record koushickv@veltech.edu.in as the email to be included with my response

The number of complex additions that we need to perform in the linear filtering of any sequence using the FFT algorithm would be: * 2 points

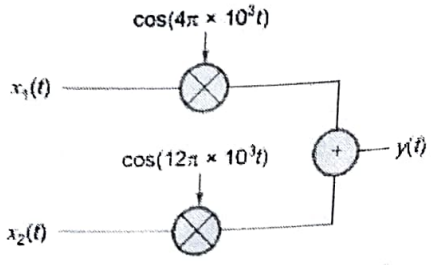
- $N\log_2 N$
- $N\log_2(N/2)$
- $(N/2)\log_2 N$
- $(N/2)\log_2(N/2)$

The circular convolution of both of these sequences X1(n)={2,1,2,1} and x2(n)={1,2,3,4} would be: * 2 points

- {14,16,14,16}
- {14,16,16,14}
- {16,14,14,16}
- {16,14,16,14}

2 points

Let $x_1(t)$ and $x_2(t)$ be two band-limited signals having bandwidth $B = 4\pi \times 10^3$ rad/s each. In the figure below, the Nyquist sampling frequency, in rad/s, required to sample $y(t)$, is



(a) $20\pi \times 10^3$
(b) $40\pi \times 10^3$
(c) $8\pi \times 10^3$
(d) $32\pi \times 10^3$

- Option A
- Option B
- Option C
- Option D

_____ is the difference between the quantized xq(n) and unquantized x(n). * 2 points

- Quantization coefficient
- Quantization ratio
- Quantization factor
- Quantization error

*

2 points

Let an input $x[n]$ having discrete time Fourier transform.

$X(e^{j\Omega}) = 1 - e^{-j\Omega} + 2e^{-3j\Omega}$ be passed through an LTI system. The frequency response of the LTI system is $H(e^{j\Omega}) = 1 - \frac{1}{2}e^{-j2\Omega}$. The output $y[n]$ of the system is

(a) $\delta[n] + \delta[n-1] - \frac{1}{2}\delta[n-2] - \frac{5}{2}\delta[n-3] + \delta[n-5]$

(b) $\delta[n] - \delta[n-1] - \frac{1}{2}\delta[n-2] - \frac{5}{2}\delta[n-3] + \delta[n-5]$

(c) $\delta[n] - \delta[n-1] - \frac{1}{2}\delta[n-2] + \frac{5}{2}\delta[n-3] - \delta[n-5]$

(d) $\delta[n] + \delta[n-1] + \frac{1}{2}\delta[n-2] + \frac{5}{2}\delta[n-3] + \delta[n-5]$

- ◯ Option A
- ◯ Option B
- ◯ Option C
- ◯ Option D

*

2 points

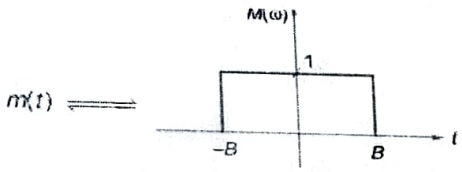
Let $m(t)$ be a strictly band-limited signal with bandwidth B and energy E. Assuming $\omega_0 = 10B$, the energy in the signal $m(t)\cos\omega_0 t$ is

(a) $\frac{E}{4}$

(b) $\frac{E}{2}$

(c) E

(d) $2E$



- ◯ E/4
- ◯ E/2
- ◯ E
- ◯ 2E

The unit sample response of any system that is described by the difference of the equation y(n)=0.5y(n-1)+2x(n) would be _____. * 2 points

- 2(0.5)nu(-n)
- 0.5(2)nu(-n)
- 2(0.5)nu(n)
- 0.5(2)nu(n)

In the Overlap save method in case of the long sequence filtering, then how many zeros do we need to append to the FIR filter's impulse response? * 2 points

- L - 1
- L + M - 1
- L + 1
- L - M + 1

The folding frequency for an aliased version of the x(n) when the sampling rate is F would be: * 2 points

- F/2D
- F/2
- F/D
- FD/2

Which of these rules do we use in the case of a bilinear transformation? * 2 points

- Trapezoidal rule
- Backward difference
- Simpson's rule
- Forward difference

(Dr. Koushick Venkate

Next

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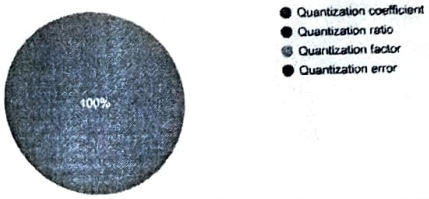
10211EC111 - DTSP (GATE Qns) - Advanced Learners

9 responses

_____ is the difference between the quantized xq(n) and unquantized x(n).

Copy

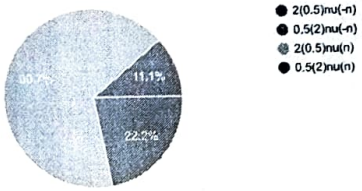
9 responses



The unit sample response of any system that is described by the difference of the equation y(n)=0.5y(n-1)+2x(n) would be _____

Copy

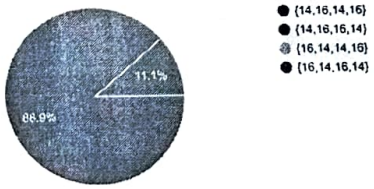
9 responses



The circular convolution of both of these sequences X1(n)={2,1,2,1} and x2(n)={1,2,3,4} would be:

Copy

9 responses



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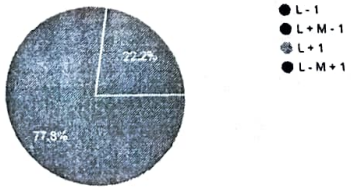
Copy

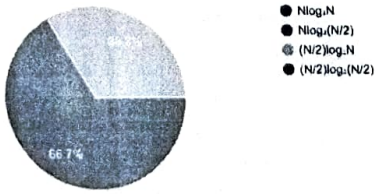
9 responses



The number of complex additions that we need to perform in the linear filtering of any sequence using the FFT algorithm would be:

Copy

9 responses



10211EC111 - DTSP (GATE Qns) - Advanced Learners

Name

9 responses

Saad Muhammed

khushbu kumari

Santhosh. S

P.Sai Mokshitha

Rohit Kumar

Rajiv chaurasiya

Priyansi

P. Karthik kumar

B.Vishnuvardhan Reddy

Reg No

9 responses

21UEEL0065

21UEEC0146

21UEEC0378

21UEEA0219

21UEEA0110

21UEEC0275

21UEEC0267

21UEEL0075

21ueel0124

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC111 DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		Course Handling Faculty : Dr B.Venkataramanaiah		
1	VTU20771	P SUSHI REKHA	8.9	28
2	VTU20776	BORRA RISHIKESH	8.7	29
3	VTU20780	MUPPARAJU ANUPRIYA	9.0	30
4	VTU20786	VANIPENTA KAVITHA SANJEEVANI	8.52	29
5	VTU20796	KUNDURI NEHA PRIYA	8.51	28.5

Training / Activities Conducted for fast learners
Motivated to solve GATE questions on DISCRETE TIME SIGNAL PROCESSING

Criteria for fast learners:CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners
The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions.

Faculty Signature **CC Signature** **HOD Signature**

Gate Questions

Name :- M. Anupriya

Vtu No :- Vtu20780

Subject :- Digicrete Time Signal Processing

Department :- ECE.

Year :- 3rd year.

F-section

Gate Questions

find the z-transform and state the region of convergance for a) $x(n) = \{1, -1, a\}$ where the time corresponds to the middle of sample of $x(n)$;

$$X(z) = z - 1 + az^{-1} \quad \text{for } 0 < |z| < \infty$$

b) $y(n) = \cos(\omega n)u(n)$ where $u(n)$ is the unit step function.

$$Y(z) = \sum_{n=-\infty}^{\infty} \cos(\omega n)\, u(n) z^{-n} = \sum_{n=0}^{\infty} \cos\omega n\, z^{-n}$$

$$= \sum_{n=0}^{\infty} 1/2 \left[e^{j\omega n} + e^{-j\omega n} \right] z^{-n}$$

$$= \frac{1}{2} \left[\sum_{n=0}^{\infty} e^{j\omega n} z^{-n} + \sum_{n=0}^{\infty} e^{-j\omega n} z^{-n} \right]$$

$$= \frac{1}{2} \left[\frac{1}{1 - e^{j\omega} z^{-1}} + \frac{1}{1 - e^{-j\omega} z^{-1}} \right]$$

$$= \frac{1}{2} \left[\frac{1 - e^{-j\omega} z^{-1} + 1 - e^{j\omega} z^{-1}}{(1 - e^{j\omega} z^{-1})(1 - e^{-j\omega} z^{-1})} \right]$$

$$= \frac{1}{2} \left[\frac{2 - (e^{-j\omega} + e^{j\omega}) z^{-1}}{1 - (e^{j\omega} + e^{-j\omega}) z^{-1} + z^{-2}} \right]$$

$$= \frac{(1 - \cos(\omega) z^{-1})}{(1 - 2\cos(\omega) z^{-1} + z^{-2})}$$

Find the Discrete fourier transform / series coefficients for the sequence $x_p(n) = 10\sin\left(\frac{2\pi n}{3}\right)$

Calculate $x_p(n)$:

$n = 0$; $x_p(0) = 0$

$n = 1$; $x_p(1) = 10\sin\left(\frac{2\pi(1)}{3}\right) = 8.66$

$n = 2$; $x_p(2) = 10\sin\left(\frac{2\pi(2)}{3}\right) = -8.66$

Calculate $x_p(k)$:

$$x_p(k) = \sum_{n=0}^{N-1} x_p(n) e^{-j\frac{2\pi}{N}nk}$$

DFT matrix: $D_N = \begin{bmatrix} 1 & 1 & 1 \\ 1 & \omega & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & e^{-j\frac{2\pi}{3}} & e^{-j\frac{4\pi}{3}} \\ 1 & e^{-j\frac{4\pi}{3}} & e^{-j\frac{8\pi}{3}} \end{bmatrix}$

$$x_p(k) = \begin{bmatrix} 1 & 1 & 1 \\ 1 & e^{-j\frac{2\pi}{3}} & e^{-j\frac{4\pi}{3}} \\ 1 & e^{-j\frac{4\pi}{3}} & e^{-j\frac{8\pi}{3}} \end{bmatrix} \begin{bmatrix} 0 \\ 8.66 \\ -8.66 \end{bmatrix}$$

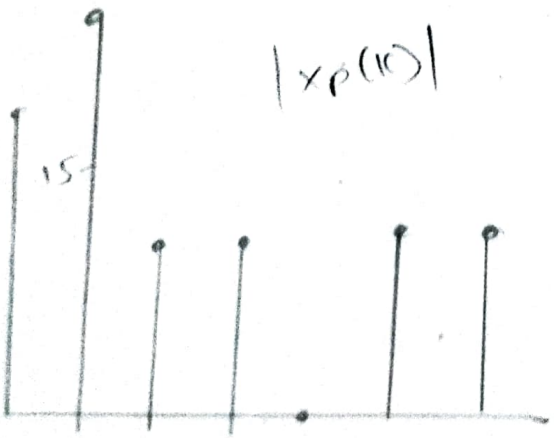
$$= \begin{bmatrix} 0+8.66-8.66 \\ 0+8.66(-0.5-j0.866)-8.66(-0.5+j0.866) \\ 8.66(-0.5+j0.866)-8.66(-0.5-j0.866) \end{bmatrix}$$

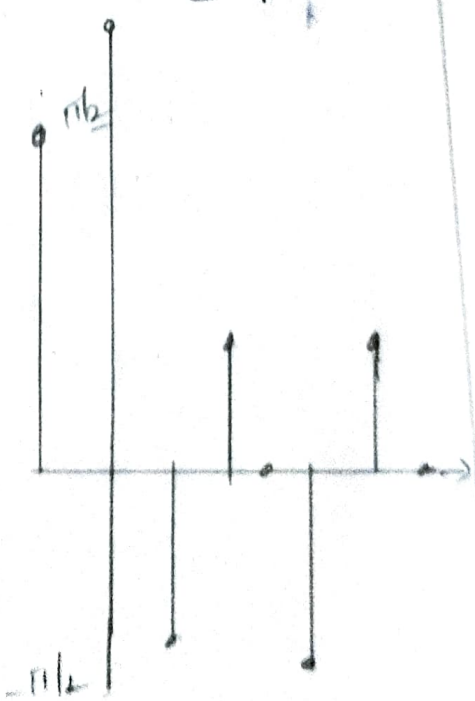
$$= \begin{bmatrix} 0 \\ -15j \\ 15j \end{bmatrix}$$

$x_p(k) = [\cdots 0 \quad -15j \quad 15j \cdots]$

$|x_p(k)| = [0 \quad 15 \quad 15]$

$\angle x_p(k) = [0 \quad -\pi/2 \quad \pi/2]$





3) Let $x(t) = 10\cos 10.5\omega t$ be passed through an LTI system having impulse response $h(t) = \Pi\left(\frac{\sin\omega t}{\pi t}\right)^2 \cos 10\omega t$. The output of the system is

Given $h(t)$ is real and even, when sinusoidal input applied to LTI system having even impulse response, then output will also be sinusoidal.

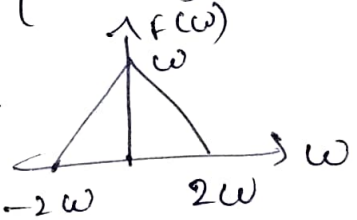
$x(t) \longrightarrow \boxed{h(t)} \longrightarrow y(t)$

$y(t) = H(\omega)_{\omega=10.5\omega} \cdot 10\cos(10.5\omega t)$

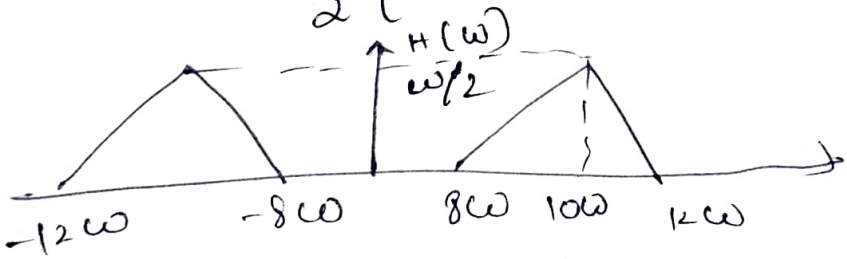
$h(t) = f(t)\cos 10\omega t$

$f(t) = \Pi\left(\frac{\sin\omega t}{\pi t}\right)^2$

$f(t) \xrightleftharpoons{FT}$



$H(\omega) = \frac{1}{2}\left[F(\omega+10\omega) + F(\omega-10\omega)\right]$



$H(\omega)|_{\omega=10.5\omega} = 3/8\,\omega$

Hence, $y(t) = \left(\frac{3}{8}\right)\omega\,(10\cos 10.5\omega t)$

$y(t) = 15/\omega \cos 10.5\omega t$

(9) Two linear time-invariant systems with transfer functions

$$G_1(s) = \frac{10}{s^2+s+1} \quad \text{and} \quad G_2(s) = \frac{10}{s^2+s\sqrt{10}+10}$$

have unit step responses $y_1(t)$ and $y_2(t)$, respectively. which of the following statements true?

a) $y_1(t)$ and $y_2(t)$ have the same percentage peak overshoot.

b) $y_1(t)$ and $y_2(t)$ have the same steady-state value.

c) $y_1(t)$ and $y_2(t)$ have the same damped frequency of oscillation

d) $y_1(t)$ and $y_2(t)$ have the same 2% settling time.

for system $G_1(s) = \frac{10}{s^2+s+1}$

Characteristics equation,

$$s^2+s+1=0$$

standard characteristics equation

$$s^2 + 2\varepsilon\omega_n s + \omega_n^2 = 0$$

on comparing, $\omega_n = 1$, $\varepsilon = 1/2 = 0.5$

$$\omega_d = \omega_n\sqrt{1-\varepsilon^2} = 1\sqrt{1-(0.5)^2} = 0.866$$

Settling time, $t_s = \frac{4}{\xi \omega_n} = 8 \text{ sec}$

Steady-state error,

$$e_{ss} = \lim_{s \to 0} \frac{s\left(\frac{1}{s}\right) \cdot 10}{s^2 + s + 1} = 10$$

$$e_{ss} = 10$$

for system, $G_2(s) = \frac{10}{s^2 + \sqrt{10}s + 10}$

Characteristics equation,

$$s^2 + \sqrt{10}s + 10 = 0$$

Standard characteristics equation,

$$s^2 + 2\xi\omega_n s + \omega_n^2 = 0$$

on comparing $\omega_n^2 = 10 \Rightarrow \omega_n = \sqrt{10}$

$$2\xi\omega_n = \sqrt{10}, \quad \xi = 0.5$$

$$\omega_d = \omega_n\sqrt{1-\xi^2} = \sqrt{10}\sqrt{1-(0.5)^2} = 2.739$$

Settling time, $t_d = \frac{4}{\xi\omega_n} = \frac{4}{0.5\sqrt{10}} = \frac{8}{\sqrt{10}} = 2.535$

Steady state error, $e_{ss} = \lim_{s \to 0} \frac{s\left(\frac{1}{s}\right) \cdot 10}{s^2 + \sqrt{10}s + 10} = 1$

Since 'ξ' value for bothe the system is same. So percentage peak overshoot for both system is same.

5) Let $y(s)$ be unit step response of a causal system, having a transfer function

$$G(s) = \frac{3-s}{(s+1)(s+3)}$$ that is, $Y(s) = \frac{G(s)}{s}$

The forced response of the system is

ans $$G(s) = \frac{3-s}{(s+1)(s+3)}$$

$$X(s) = \frac{G(s)}{s} = \frac{3-s}{s(s+1)(s+3)}$$

Using partial fractions, we get

$$Y(s) = \frac{A}{s} + \frac{B}{(s+1)} + \frac{C}{(s+3)}$$

$$A(s^2+4s+3) + B(s^2+3s) + C(s^2+s) = 3-s$$

$$A+B+C = 0$$

$$4A+3B+C = -1$$

and $$3A = 3$$

Therefore, we get $A=1, B=-2, C=1$

$$Y(s) = \frac{1}{s} - \frac{2}{s+1} + \frac{1}{s+3}$$

and $$y(t) = u(t) - 2e^{-t}u(t) + e^{-3t}u(t)$$

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DEPARTMENT OF ECE
VTRUGE21 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC111 / DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr.S.JANA

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	TEST I
Section : G		Course Handling Faculty :Diana Earshia		
1	VTU18973	JAVVAJI SHAMVIDA	8.7	28
2	VTU21249	LAKKIMSETTY SRIRAMA KOTESWARA RAO	8.6	28.5

Training / Activities Conducted for fast learners
Power spectrum using software-matlab

Criteria for fast learners: CGPA greater than 8.5 and TEST1 greater than 25

Improvement/ Achievement of fast learners

The above activity Kindled the student interest in mobile communication

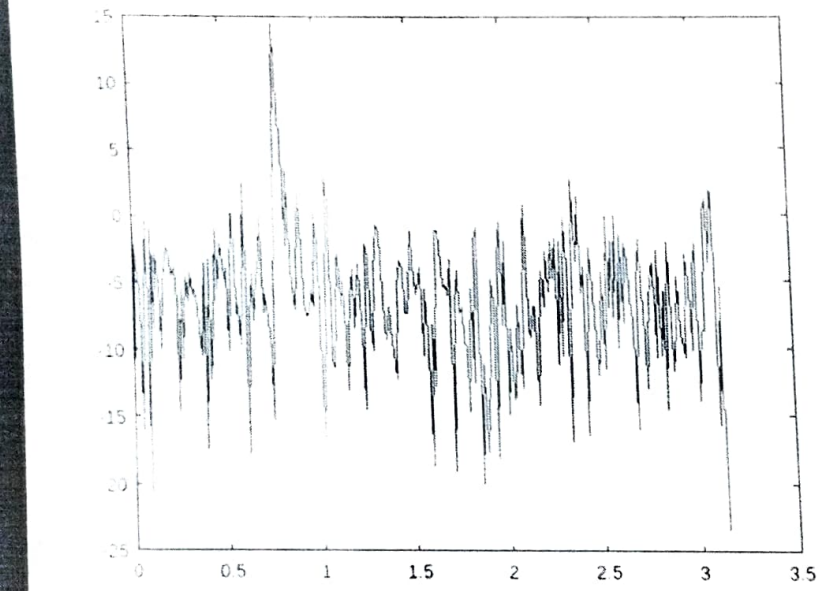
Faculty Signature **Course Coordinator** **HOD Signature**

1. Estimate the Power spectrum using software-matlab

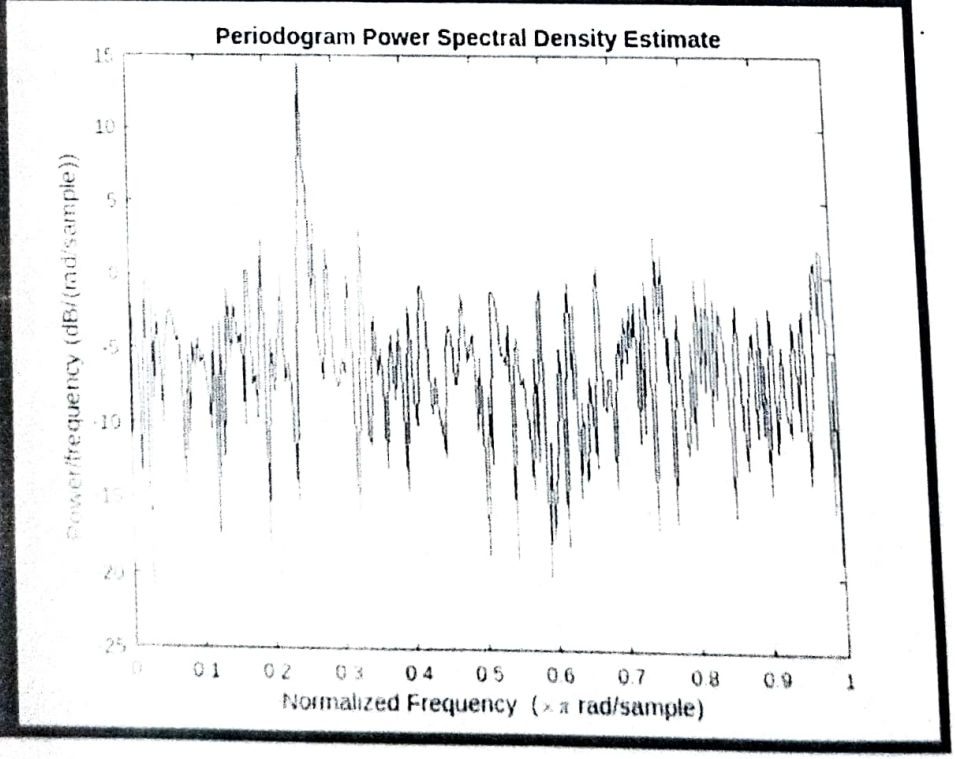
Submitted by:

JAVVAJI SHAMVIDA- VTU18973

```
n = 0:319;
x = cos(pi/4*n)+randn(size(n));
[pxx,w] = periodogram(x);
plot(w,10*log10(pxx))
```




```
periodogram(x)
```



1. Estimate the Power spectrum using software-matlab

Submitted by:

JAVVAJI SHAMVIDA- VTU18973

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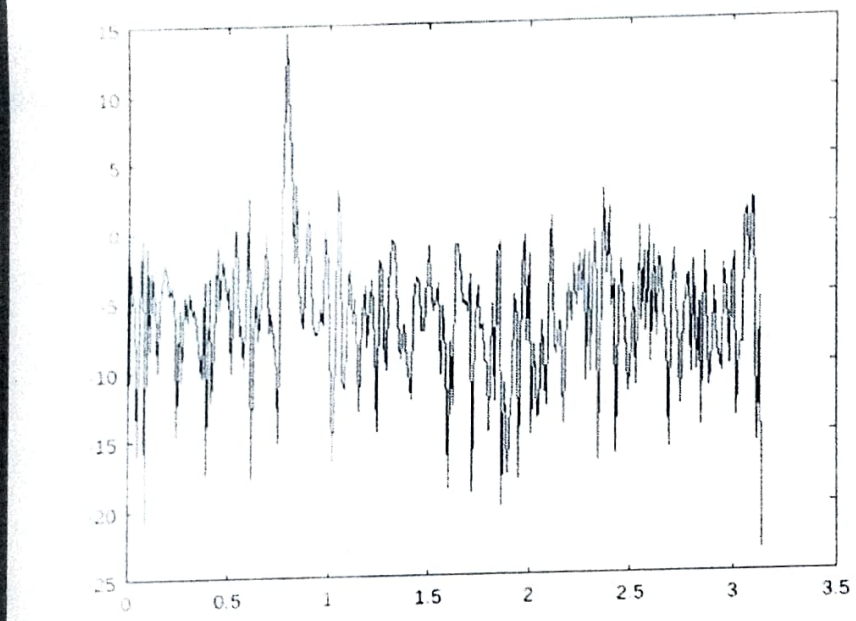
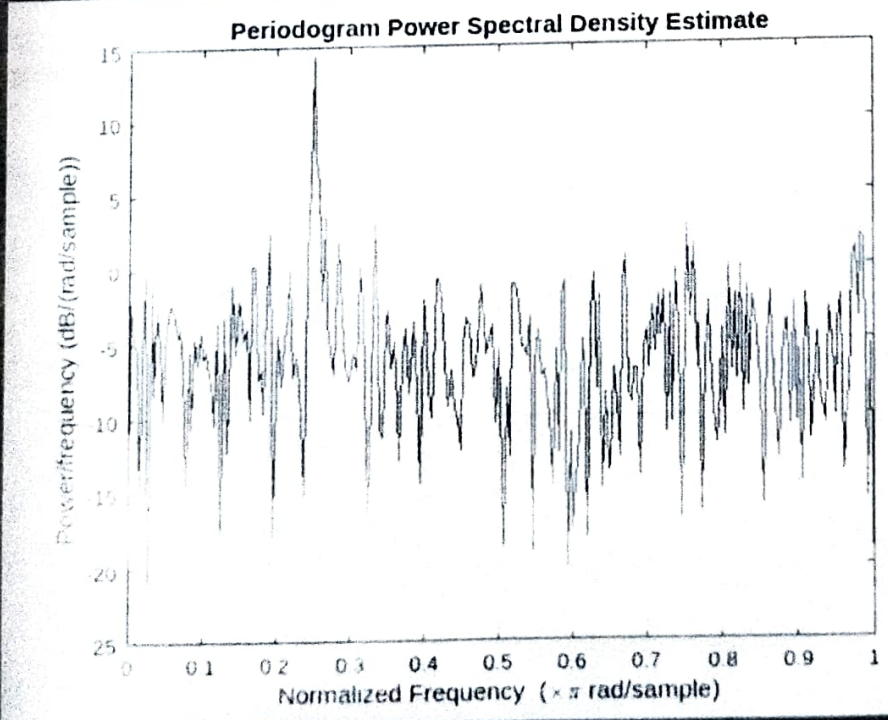
n = 0:319;
x = cos(pi/4*n)+randn(size(n));
[pxx,w] = periodogram(x);
plot(w,10*log10(pxx))
```




```
periodogram(x)
```

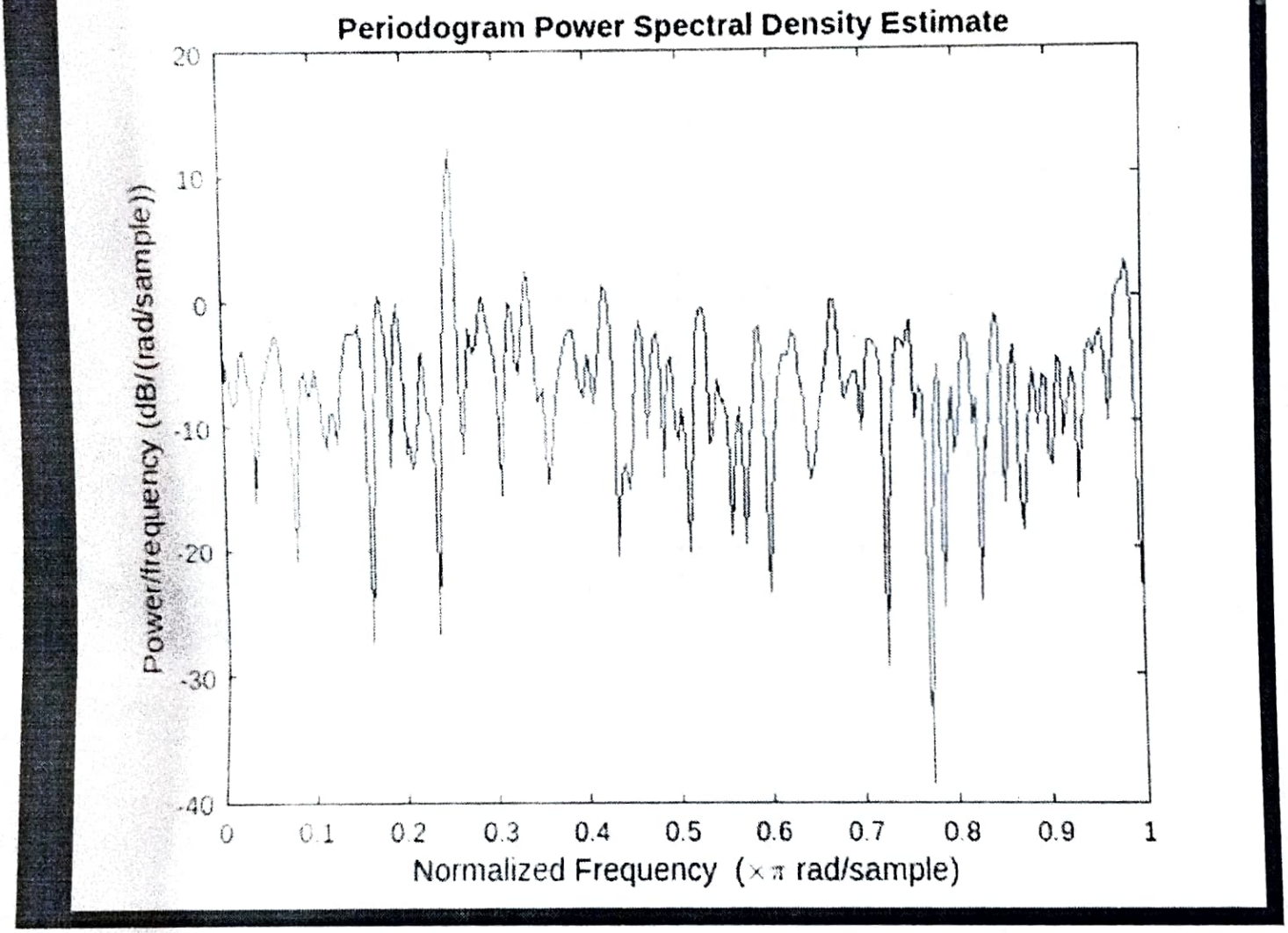


2. Estimate Modified Periodogram with Hamming Window

Submitted by:

LAKKIMSETTY SRIRAMA KOTESWARA RAO- VTU21249

```
n = 0:319;
x = cos(pi/4*n)+randn(size(n));
periodogram(x,hamming(length(x)))
```



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DEPARTMENT OF ECE
VTR UGE - 21
B.TECH – ECE
SUMMER 2023-24

FAST LEARNERS – ACTION TAKEN REPORT

Course Code and Title : 10211EC111 and Discrete time signal processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Test I	CGPA
Section : II _		Course Handling Faculty : Mr K.Sambath Kumar		
		Nil		

Training / Activities Conducted for fast learners

Criteria for fast learners: T1 greater than 24 and CGPA greater than 8.5

Improvement/ Achievement of fast learners

Faculty Signature

CC Signature

HOD Signature

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DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC111 Discrete Time Signal Processing

Course Coordinator : Dr S Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		Course Handling Faculty : Dr S Jana		
2	VTU19382	A LIKHITHA	8.8	29
3	VTU20086	MEDISETTI BHANU VASANTH		26.5
4	VTU20369	PADIGAPATI VANDANA	8.6	26
5	VTU20515	MUTHYABOINA AKSHITHA	8.8	26.5
6	VTU20769	HARSHANNJALI KANNE	8.5	28.5
7	VTU20871	CHERUKURU YASHASWINI	9.3	28.5
8	VTU21242	CHAPALA VEERA NAGA KALYAN BABU	8.6	27

Training / Activities Conducted for fast learners

- Motivated to solve GATE questions related to Digital Signal Processing.
- Matlab Programs for signal processing applications

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

C. Yashaswini
(VTU20874)

1. The trignometric fourier series of an even function does not have an

GATE 2022

Solution: sine terms

2. Consider a discrete time periodic signal with period N=5. Let the discrete time fourier series rep. be $x[n] = \sum_{k=0}^{4} a_k e^{j\frac{2\pi n}{5}}$ where $a_0=1$, $a_1=3j$, $a_2=2j$, $a_3=-2j$ and $a_4=-3j$. The value of sum $\sum_{n=0}^{4} x[n] \sin\frac{4\pi n}{5}$ is

GATE 2023

Solution:

Let, $I = \sum_{n=0}^{4} x(n) \sin\frac{4\pi n}{5}$

$= \frac{1}{2j} \sum_{n=0}^{4} x(n) \cdot \left[e^{j\frac{4\pi n}{5}} - e^{-j\frac{4\pi n}{5}}\right]$

$= \frac{1}{2j}\left[\sum_{n=0}^{4} x(n) e^{j\frac{4\pi n}{5}} - \sum_{n=0}^{4} x(n) e^{-j\frac{4\pi n}{5}}\right] \longrightarrow (1)$

From q: $a_k = \frac{1}{N}\sum_{n=0}^{4} x(n) \cdot e^{-jk\frac{2\pi}{N}n} = \frac{1}{5}\sum_{n=0}^{4} x(n) e^{-j\frac{2\pi kn}{N}}$

put $k=2$ $\quad a_2 = \frac{1}{5}\sum_{n=0}^{4} x(n) e^{-j\frac{4\pi n}{5}}$

put $k=-2$ $\quad a_{-2} = \frac{1}{5}\sum_{n=0}^{4} x(n) e^{j\frac{4\pi n}{5}}$

From eq (1)

$I = \frac{1}{2j}\left[5a_{-2} - 5a_2\right] = \frac{5}{2j}\left[a_3 - a_2\right]$

$= \frac{5}{2j}\left[-2j - 2j\right) = \frac{5(-4j)}{2j} = -10$

$a_{-2} = a_{-2+N}$
$= a_{-2+5}$
$= a_3$

∵ option C is correct

3. The DFT of 4-point sequence $x[n] = \{x[0], x[1], x[2], x[3]\}$ $= \{3, 2, 3, 4\}$ is $X[k] = \{12, 2j, 0, -2j\}$. If $x_1(k)$ is the DFT of 12-point sequence $x_1(k) = \{3, 0, 0, 2, 0, 0, 3, 0, 0, 4, 0, 0\}$ the value of $\left|\frac{x_1[8]}{x_1[11]}\right|$ is

GATE EC 2015 SET-2

Solution:

$x_1[n] = x\left[\frac{n}{3}\right]$ upsampling of $x(n)$

$x_1[k] = \{12, 2j, 0, -2j, 12, 2j, 0, -2j, (12), 2j, 0, (-2j)\}$

$\frac{x_1(8)}{x_1(11)} = \left|\frac{12}{-2j}\right| = 6$

4. The value $\sum_{n=0}^{\infty} n\left(\frac{1}{2}\right)^n$ is

GATE 2015 SET-3

Solution:

$\sum_{n=0}^{\infty} \left(\frac{1}{2}\right)^n = \sum_{n=-\infty}^{\infty} n\left(\frac{1}{2}\right)^n u(n)$

by taking z-transform

$= \left.\frac{\frac{1}{2}z^{-1}}{\left(1-\frac{1}{2}z^{-1}\right)^2} = \frac{\frac{z}{2}}{\left(z-\frac{1}{2}\right)^2}\right|_{z=1}$

$= \frac{\frac{1}{2}}{1/4} = \frac{4}{2} = 2$

5. Consider two real sequences with time origin marked by $x_1[n] = \{1, 2, 3, 0\}$, $x_2[n] = \{1, 3, 2, 1\}$. Let $X_1(k)$ & $X_2(k)$ be 4-point DFT of $x_1[n]$ & $x_2[n]$. Another sequence $x_3[n]$ is derived by taking 4-point inverse DFT of $X_3(k) = X_1(k) X_2(k)$. The value of $x_3[2]$ is

GATE EC 2015 SET-2

Solution:

$x_1[n] = \{1,2,3,0\}$, $x_2[n] = \{1,3,2,1\}$

$x(k)_3 = x(k)_1 \cdot x(k)_2$

* $x_3[n]$: circular convolution of $x_1[n]$ & $x_2[n]$

$$x_3[n] = x_1[n] \otimes x_2[n]$$

$$\begin{bmatrix} x_3(0) \\ x_3(1) \\ x_3(2) \\ x_3(3) \end{bmatrix} = \begin{bmatrix} 1 & 0 & 3 & 2 \\ 2 & 1 & 0 & 3 \\ 3 & 2 & 1 & 0 \\ 0 & 3 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \\ 2 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1+0+6+2 \\ 2+3+0+3 \\ 3+6+2+0 \\ 0+9+4+1 \end{bmatrix} = \begin{bmatrix} 9 \\ 8 \\ 11 \\ 14 \end{bmatrix}$$

$x_3(2) = 11$

* For N-point FFT algorithm $N = 2^m$, which one of the following statements is true

GATE EC 2010

Option D is correct

Solution: For an N-point FFT algorithm with $N = 2^m$, computation of a butterfly requires only one complex multiplication and two complex additions.

* The 4-point DFT of DTS $\{1,0,2,3\}$ is

GATE EC 2009

Solution:

4-point DFT sequence $\{1,0,2,3\}$ is given as by

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -j & -1 & j \\ 1 & -1 & 1 & -1 \\ 1 & j & -1 & -j \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 2 \\ 3 \end{bmatrix} = \begin{bmatrix} 1+2+3 \\ 1-2+3j \\ 1+2-3 \\ 1-2-3j \end{bmatrix} = \begin{bmatrix} 6 \\ -1+3j \\ 0 \\ -1-3j \end{bmatrix}$$

$\therefore$ Option D is correct

N·E·A·T
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National Educational Alliance for Technology

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Director, Education
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STUDENT USER ID STU2023mvip150920230001326

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC111 – DISCRETE TIME SIGNAL PROCESSING

Course Coordinator : Dr.S.JANA

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : I		Course Handling Faculty : Mr.M.Pandiyarajan		
1	VTU19823	VELLATURI RAMYA	8.7	28

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- GATE exam questions were discussed.
- Solved additional problems to get highest grade in end semester examination
- Participated in AICTE Internship program in MALTAB

Improvement/ Achievement of fast learners

- Performance in CIA and Internal marks is improved.
- Able to solve GATE exam practice questions
- Programming skills were improved

Faculty Signature **Course Coordinator** **HOD Sign**

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14 July 2023

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MATLAB Onramp

DIRECTOR, TRAINING SERVICES

13 April 2023

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has successfully completed **100%** of the self-paced training course

Machine Learning Onramp

DIRECTOR, TRAINING SERVICES

21 July 2023

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Ramya vellaturi

has successfully completed **100%** of the self-paced training course

Signal Processing Onramp

DIRECTOR, TRAINING SERVICES

26 July 2023

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
WINTER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC111 & Discrete Time Signal Processing

Course Coordinator : Dr. S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : J		**Course Handling Faculty :** Mr. S.Aswath		
1.	21096	M.S. Lakshana	8.5	29
2.	21098	SV.L. Sai Neha	9.1	27

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners
1. Solved Gate questions to enhance their knowledge.
2. Advised them to participate in workshops/symposiums to improve their quest to study more.

Improvement/ Achievement of fast learners
1. Analytical skills of those two students are improved.

Faculty Signature **Course Coordinator** **HOD/ ECE**

SEC:3

Gate problems in DSP

Teaching Learning Center
IIT Hyderabad

Abstract : ***These problems have been selected from GATE question papers and can be used for conducting tutorials in courses related to the course Digital Signal Processing in practice.***

1) If the impulse response of a discrete-time system is $h[n] = -5^n u[-n-1]$,then the system function $H(z)$ is equal to

(A) $\frac{-z}{z-5}$ and the system is stable

(B) $\frac{z}{z-5}$ and the system is stable

(C) $\frac{-z}{z-5}$ and the system is unstable

(D) $\frac{z}{z-5}$ and the system is unstable

2) A sequence $x(n)$ with the z-transform $X(z) = z^4 + z^2 - 2z + 2 - 3z^{-4}$ is applied as an input to a linear,time-invariant system with the impulse response $h(n) = 2\delta(n-3)$ where

$$\delta(n) = \begin{cases} 1, & \text{if n=0} \\ 0, & \text{otherwise} \end{cases}.$$

The output at n=4 is

(A) -6 (B) 0 (C) 2 (D) -4

Data for ***Q.3-4*** are given below. Solve the problems and choose the correct answers.
The system under consideration is an RC low-pass filter (RC-LPF) with R=1.0KΩ and C=1.0 μF

3) Let $H(f)$ denote the frequency response of the RC-LPF. Let f_1 be the highest frequency such that $0 \leq |f| \leq f_1, \frac{|H(f_1|}{H(0)} \geq 0.95$.Then f_1 (in HZ) is

(A) 327.8 (B) 163.9 (C) 52.2 (D) 104.4

4) The impulse response $h[n]$ of a linear time-invariant system is given by $h[n] = u[n+3] + u[n-2] - 2u[n-7]$ where $u[n]$ is the unit step sequence.The above system is

(A) Stable but not causal

(B) Stable and Causal

(C) Causal but unstable

(D) Unstable and not Causal

5) The z-transform of a system is $H(z) = \frac{z}{z-0.2}$.If the ROC IS $|z| < 0.2$, then the impulse response of the system is

(A) $(0.2)^n u[n]$ (C) $-(0.2)^n u[n]$

(B) $(0.2)^n u[-n-1]$ (D) $-(0.2)^n u[-n-1]$

6) consider the sequence $x[n] = [4 - j5 \;\; 1 + j2 \;\; 4]$ The conjugate anti-symmetric part of the sequence is

(A) $[-4 - j2.5 \;\; j2 \;\; 4 - j2.5]$

(B) $[-j2.5 \;\; 1 \;\; j2.5]$

(C) $\{-j5, j2, 0\}$

(D) $\{-4, 1, 4\}$

7) A causal LTI system is described by the difference equation $2y[n] - ay[n-2] = 2x[n] + bx[n-1]$.
the system is stable only if
(A) $|a| < 2, |b| < 2$

(B) $|a| > 2, |b| > 2$

(C) $|a| < 2$ any value of b

(D) $|b| < 2$, any value of a

8) The impulse response $h[n]$ of a linear time invariant system is given as

$$h[n] = \begin{cases} -2\sqrt{2}, & \text{if } n=1,-1 \\ 4\sqrt{2}, & n=2,-2 \\ 0, & \text{otherwise.} \end{cases}$$

If the input to the above system is the sequence $e^{\frac{j\pi n}{4}}$,then the ouput is

(A) $4\sqrt{2}e^{\frac{j\pi n}{4}}$ (C) $4e^{\frac{j\pi n}{4}}$

(B) $4\sqrt{2}e^{-\frac{j\pi n}{4}}$ (D) $-4e^{\frac{j\pi n}{4}}$

9) The region of convergence of Z-transform of the sequence $(\frac{5}{6})^n u(n) - (\frac{5}{6})^n u(-n-1)$ must be

(A) $|z| < \frac{5}{6}$ (C) $\frac{5}{6} < |z| < \frac{6}{5}$

(B) $|z| > \frac{6}{5}$ (D) $\frac{5}{6} < |z| < \infty$

10) A signal $x(n) = \sin(\omega_0 n + \phi)$ is the input to a LTI system frequency response $H(e^{j\omega})$.If the ouput of the system is $Ax(n - n_0)$, then the most general form of $\angle H(e^{j\omega})$ will be
(A) $-n_0\omega_0 + \beta$ for any arbitary real β

(B) $-n_0\omega_0 + 2\pi k$ for any arbitary integer k

(C) $n_0\omega_0 + 2\pi k$ for any arbitary integer k

(D) $-n_0\omega_0 + \phi$

11) A system with input $x[n]$ and the output $y[n]$ is given as $y[n] = (\sin\frac{2}{6}\pi n)x[n]$.The system is
(A) Linear,stable and invertible

(B) non-linear,stable and non-invertible

(C) linear,stable and non-invertible

(D) linear,unstable and invertible

12) A 5-point sequence $x[n]$ is given as $x[-3] = 1, x[-2] = 1, x[-1] = 0, x[0] = 5, x[1] = 1$. Let $X(e^{j\omega})$ denote the discrete-time Fourier transform of $x[n]$. The value of $\int_{-\pi}^{\pi} X(e^{j\omega})d\omega$ is :

(A) 5 (B) 10π (C) 16π (D) $5+j5$

13) The z-transform $X[z]$ of a sequence $x[n]$ is given by $X[z] = \frac{0.5}{1-2z^{-1}}$.It is given that the region of convergence of $X[z]$ includes the unit circle. The value of $x[0]$ is:

(A) -0.5 (B) 0 (C) 0.25 (D) 0.5

14) A discrete time linear shift-invariant system has an impulse response $h[n]$ with $h[0] = 1, h[1] = -1, h[2] = -2$ and zero otherwise.The system is given an input sequence $x[n]$ with $x[0] = x[2] = 1$, and zero otherwise. The number of nonzero samples in the output sequence $y[n]$,and the value of $y[0]$ are, respectively

(A) 5,2 (C) 6,1

(B) 6,2 (D) 5,3

5) $\{x(n)\}$ is real-valued periodic sequence with a period N. $x(n)$ and $X(k)$ form N-point.Discrete Fourier Transform (DFT) pairs. The DFT $Y(k)$ of the sequence $y(n) = \frac{1}{N}\sum_{r=0}^{N-1} x(r)x(n+r)$

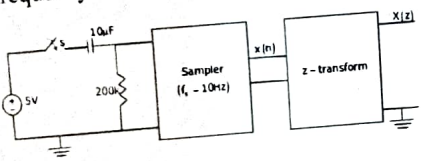
(A) $|X(k)|^2$

(B) $\frac{1}{N}\sum_{r=0}^{N-1} X(r) * X(k+r)$

(C) $\frac{1}{N}\sum_{r=0}^{N-1} X(r)X(k+r)$

(D) 0

DATA FOR Q.16 AND 17 In the following network, the switch is closed at t=0^- and the sampling starts from t=0. The sampling frequency is 10Hz.



16). The samples $x(n)$ at n=0,1,2,... given by

(A) $5(1 - e^{-0.05n})$

(B) $5e^{-0.05n}$

(C) $5(1 - e^{-5n})$

(D) $5e^{-5n}$

17) The expression and the region of convergence of the z-transform of the sampled signal are

(A) $\frac{5z}{z-e^{-5}}, |z| < e^{-5}$

(B) $\frac{5z}{z-e^{-0.05}}, |z| < e^{-0.05}$

(C) $\frac{5z}{z-e^{-5}}, |z| > e^{-0.05}$

(D) $\frac{5z}{z-e^{-5}}, |z| > e^{-5}$

18) The ROC of Z-transform of the discrete time sequence $x(n) = (\frac{1}{3})^n u(n) - (\frac{1}{2})^n u(-n-1)$ is

(A) $\frac{1}{3} < |z| < \frac{1}{2}$ (C) $|z| < \frac{1}{3}$

(B) $|z| > \frac{1}{2}$ (D) $2 < |z| < 3$

19) A system with transfer function $H(z)$ has impulse response h(x) defined as h(2)=1,h(3)=-1 and h(k)=0 otherwise.Consider the following statements.

S1: H(z) is a low pass filter

S2: H(z) is a FIR filter

which of the following is correct ?

(A) Only S2 is true

(B) Both S1 and S2 are false.

(C) Both S1 and S2 are true, and S2 is a reason for S1

(D) Both S1 and S2 are true, but S2 is not a reason for S1

20) Consider the z-transform $X(z) = 5z^2 + 4z^{-1} + 3; 0 < |z| < \infty$. The inverse z-transform $x[n]$

(A) $5\delta[n+2] + 3\delta[n] + 4\delta[n-1]$

(B) $5\delta[n-2] + 3\delta[n] + 4\delta[n+1]$

(C) $5u[n+2] + 3u[n] + 4u[n-1]$

(D) $5u[n-2] + 3u[n] + 4u[n+1]$

21) Two discrete time systems with impulse responses $h_1[n] = \delta[n-1]$ and $h_2[n] = \delta[n-2]$

are cascade. The overall impulse response of the cascaded system is

(A) $\delta[n-1]+\delta[n-2]$ (C) $\delta[n-3]$

(B) $\delta[n-4]$ (D) $\delta[n-1]\delta[n-2]$

22) The transfer function of a discrete time LTI system is given by $H(z)=\frac{2-\frac{3}{4}z^{-1}}{1-\frac{3}{4}z^{-1}+\frac{1}{8}z^{-2}}$
Consider the following statements:
S1:The system is stable and causal for ROC:$|z|>\frac{1}{2}$
S2:The system is stable but not causal for ROC:$|z|<\frac{1}{4}$
S3:The system is neither stable nor causal for ROC:$\frac{1}{4}<|z|<\frac{1}{2}$
Which one of the following statements is valid?
(A) Both S1 and S2 are true.

(B) Both S2 and S3 are true.

(C) Both S1 and S3 are true.

(D) S1,S2 and S3 are all true.

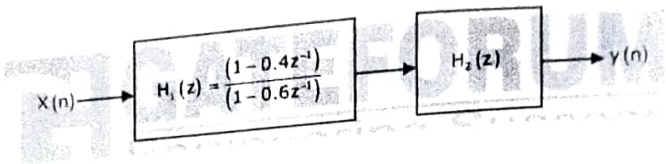
23) A system is defined by its impulse response $h(n)=2^n u(n-2)$. The system is
(A) stable and causal

(B) causal but not stable

(C) stable but not causal

(D) unstable and non-causal

24) Two systems $H_1(z)$ and $H_2(z)$ are connected in cascade as shown below.The overall output y(n) is the same as the input x(n) with a one unit delay. The transfer function of the second system $H_2(z)$ is



(A) $\frac{(1-0.6z^{-1})}{z^{-1}(1-0.4z^{-1})}$ (C) $\frac{z^{-1}(1-0.4z^{-1})}{(1-0.6z^{-1})}$

(B) $\frac{z^{-1}(1-0.6z^{-1})}{(1-0.4z^{-1})}$ (D) $\frac{(1-0.4z^{-1})}{z^{-1}(1-0.6z^{-1})}$

25) The first 6 points of the 8-point DFT of a real valued sequence are 5,1-j3,0,3-j4,0 and 3+j4. The last two points of the DFT are respectively

(A) 0,1-j3 (C) 1+j3,5

(B) 0,1+j3 (D) 1-j3,5

26) Let x[n]=x[-n]. Let X(z) be the z-transform of x[n]. If 0.5+j0.25 is a zero of X(z) then one of the following must be a zero of X(z).

(A) $0.5-j0.25$ (C) $\frac{1}{0.5-j0.25}$

(B) $\frac{1}{0.5+j0.25}$ (D) $2+j4$

27) The input-output relationship of a causal stable LTI system is given as $y[n]=\alpha y[n-1]+\beta x[n]$ If the impulse response $h[n]$ of this system satisfies the condition $\sum_{n=0}^{\infty}h[n]=2$, the relationship between α and β is

(A) $\alpha=1-\frac{\beta}{2}$ (C) $\alpha=2\beta$

(B) $\alpha=1+\frac{\beta}{2}$ (D) $\alpha=-2\beta$

28) The pole-zero diagram of causal and stable discrete-time system is shown in figure. The zero at the origin has multiplicity 4. The impulse response of the system is $h[n]$. If $h[0]=1$, we can conclude

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC111 & Discrete Time Signal Processing

Course Coordinator : Dr. S.Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : K		**Course Handling Faculty :** Ms.SUBHA K J		
1.	VTU20403	K. HARSHITHA	9.1	29.5
2.	VTU21002	ANGAM TEJA VARDHANESWAR	8.5	24
3.	VTU21287	TEKIMUDI SRISAI LAKSHMI REVATHI	9.1	27.5
4.	VTU21310	NIDIGANTI LAKSHMI PRASANNA	9.0	27.5
5.	VTU19205	B PRIYANKA	8.5	24
6.	VTU20401	THOKALA VIKAS REDDY	8.69	24
7.	VTU19686	CHAVALA JAHNAVI	8.6	27.5

Training / Activities Conducted for fast learners

1. Advised the students to participate workshop / project presentation / paper presentation / technical events.
2. Motivated to participate in project expo/ competitions

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

1. Few students have participated in competitions and won prizes.
2. Some students have attended workshops and seminars related to the course.

Faculty Signature **Course Coordinator** **HOD/ ECE**

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Lakshmi Prasanna

has successfully completed **100%** of the self-paced training course

MATLAB Onramp

DIRECTOR, TRAINING SERVICES

16 July 2023

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Course Completion Certificate

T. Sri Sai Lakshmi Revathi

has successfully completed **100%** of the self-paced training course

Signal Processing Onramp

Craig T. Santos

DIRECTOR, TRAINING SERVICES

22 July 2023

MathWorks® | *Training Services*

Course Completion Certificate

Lakshmi Prasanna

has successfully completed **100%** of the self-paced training course

Signal Processing Onramp

DIRECTOR, TRAINING SERVICES

23 July 2023

b

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21B.TECH – ECE
SUMMER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC111-Discrete Time Signal Processing

Course Coordinator : Dr. S. Jana

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : L		Course Handling Faculty : Dr.V.Gnanaprakash		
		NIL		

Training / Activities Conducted for fast learners
-

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Improvement/ Achievement of fast learners
-

Faculty Signature

CC Signature

HOD Signature

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 – B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		**Course Handling Faculty: Dr.T.Kavitha**		
1	VTU20401	THOKALA VIKAS REDDY	8.8	26
2	VTU20456	LEVAKU PAVAN KUMAR REDDY	9	27.5
3	VTU20468	GUDURU NANDHINI	8.8	29
4	VTU20854	NALLAGATLA VISHNUSAI	8.5	26
5	VTU20871	CHERUKURU YASHASWINI	9.3	29
6	VTU20903	AKULA LOKESH	8.5	24.5
7	VTU20938	PUTTURU SAI MOKSHITHA	8.8	30
8	VTU21287	TEKIMUDI SRI SAI LAKSHMI REVATHI	9.1	29
9	VTU21310	NADIGANTI LAKSHMI PRASANNA	8.9	29.5
10	VTU23960	MADITHATI SIVA CHANDRA LEKHA	8.8	29.5
11	VTU24010	KATAMREDDY POOJITHA REDDY	8.9	29

Training / Activities Conducted for fast learners

- Encouraged students to take up competitive exams like GATE, GRE, TOEFL, IELTS, CAT, PGCET etc
- Also provided opportunities to develop their creativity by participating and organizing intercollegiate as well as ***national level technical symposiums***
- Placement oriented activities – Technical round HR questions discussed
- Advised them to participate in national level conference

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

Few students got benefitted from the discussion and they are preparing journal papers
Students interested for internship in national and international levels

Faculty Signature

CC Signature

HOD Signature

1. Consider a wireless communication link between a transmitter and a receiver located in free space, with finite and strictly positive capacity. If the effective areas of the transmitter and the receiver antennas, and the distance between them are all doubled, and everything else remains unchanged, the maximum capacity of the wireless link
   a. Increases by a factor of 2
   b. Decrease by factor 2
   c. Remains unchanged
   d. Decrease by a factor sqrt(2)
2. A symbol stream contains alternate QPSK and 16-QAM symbols. If symbols from this stream are transmitted at the rate of 1 mega-symbols per second, the raw (uncoded) data rate is _____ mega-bits per second (rounded off to one decimal place).

   Answer: 3
3. Which one of the following statements about differential pulse code modulation (DPCM) is true?

   A The sum of message signal sample with its prediction is quantized

   B The message signal sample is directly quantized, and its prediction is not used

   C The difference of message signal sample and a random signal is quantized

   D The difference of message signal sample with its predictions is quantized

4.

Four messages band limited to W, W, 2 W and 3 W respectively are to be multiplexed using Time Division Multiplexing (TDM). The minimum bandwidth required for transmission of this TDM signal is

A 1 W

B 3 W

C 6 W

D 7 W

5.

The raised cosine pulse p(t) is used for zero ISI in digital communications. The expression for p(t) with unity roll-off factor is given by

$$p(t) = \frac{\sin 4\pi W t}{4\pi W t(1 - 16W^2t^2)}$$

The value of p(t) at $t = \frac{1}{4W}$ is

A -0.5

B 0

C 0.5

D ∞

In a Direct sequence CDMA system the chip rate is 1.2288×10^6 chips per second. If the processing gain is desired to be at least 100. The data rate .

A must be less than or equal to 12.288×10^3 bits per sec.

B must be greater than $12.288 \times \cdot 10^3$ bits per sec.

C must be exactly equal to 12.288×10^3 bits per sec.

D can take any value less than 12.288×10^3 bits per sec.

A speech signal, band limited to 4 kHz and peak voltage varying between + 5V and - 5V is sampled at the Nyquist rate. Each sample is quantized and represented by 8 bits.
Assuming the signal to be uniformly distributed between its peak values, the signal to noise ratio at the quantizer output is

A 16 dB

B 32 dB

C 48 dB

D 64 dB

6.

A speech signal, band limited to 4 kHz and peak voltage varying between + 5V and - 5V is sampled at the Nyquist rate. Each sample is quantized and represented by 8 bits.
If the bits 0 and 1 are transmitted using bipolar pulses, the minimum bandwidth required for distortion free transmission is

A 64 kHz

B 32 kHz

C 8 kHz

D 4 kHz.

7.

A speech signal, band limited to 4kHz and peak voltage varying between +5V and -5V is sampled at the Nyquist rate. Each sample is quantized and represented by 8 bits.
The number of quantitization levels required to reduce the quantization noise by a factor of 4 would be

A 1024

B 512

C 256

D 64

In a GSM system, 8 channels can co-exist in 200 KHz bandwidth using TDMA. A GSM based cellular operator is allocated 5 MHz bandwidth. Assuming a frequency reuse factor of 1/5, i. e. a five-cell repeat pattern,, the maximum number of simultaneous channels that can exist in one cell is

A 200

B 40

C 25

D 5

In a Direct sequence CDMA system the chip rate is 1.2288×10^6 chips per second. If the processing gain is desired to be at least 100. The data rate

(A) must be less than or equal to 12.288×10^3 bits per sec.

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(C) must be exactly equal to 12.288×10^3 bits per sec.

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A rectangular pulse existing between t = 0 and t = T and having an amplitude A is to be received by a matched filter

(a) Draw the impulse response of the matched filter labeling all important points and the axes.

(b) Find the signal shape at the filter output. Lable all important points and axes.

1. Consider a wireless communication link between a transmitter and a receiver located in free space, with finite and strictly positive capacity. If the effective areas of the transmitter and the receiver antennas, and the distance between them are all doubled, and everything else remains unchanged, the maximum capacity of the wireless link
   a. Increases by a factor of 2
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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTR UGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. T. Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty : Dr. C.R. Bharathi**		
1.	VTU18973	JAVVAJI SHAMVIDA	8.7	30
4.	VTU20710	KAMBAM BHARGAV REDDY	8.5	29.5
7.	VTU21050	BANDLAMUDI SAI KUMAR	8.5	29
14.	VTU21016	REDROWTHU SAI GOWTHAM	8.5	25.5

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Planned to solve more gate problems in wireless communication.
- Planned to attend seminar or workshop related to wireless communication.

Improvement/ Achievement of fast learners

Improvement in understanding the concepts

C.R. Bharathi
Faculty

Course Coordinator

HOD/ECE

IEEE Madras Section

IEEE Region 10

IEEE Region 10 Student Activities Committee

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

MADRAS SECTION

CERTIFICATE OF PARTICIPATION

This is to certify that Y. RANJITH KUMAR

~~*SB Counsellor*~~ / ~~*SB Chair*~~/ *SB Representative of* VELTECH UNIVERSITY

has participated in the ***IEEE R10 - Madras Section Student Summit 2023*** *[SB Officer Training] organized by IEEE Madras Section at College of Engineering Guindy, Anna University, Chennai on 14 October 2023.*

Dr. R. HARIPRAKASH
Secretary
IEEE Madras Section

Dr. K. PORKUMARAN
Chairman
IEEE Madras Section

IEEE Madras Section

IEEE Region 10

IEEE Region 10 Student Activities Committee

INSTITUTE OF ELECTRICAL AND ELECTRONICS NGINEERS, INC.

MADRAS SECTION

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~~*SB Counsellor*~~ / ~~*SB Chair*~~/ *SB Representative of* VELTECH UNIVERSITY ✓

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Dr. R. HARIPRAKASH
Secretary
IEEE Madras Section

Dr. K. PORKUMARAN
Chairman
IEEE Madras Section

IEEE MADRAS SECTION | CAS | Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology | enthutech

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that Y. RANJITH KUMAR (VTU23961), IIIear ECE Student, of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology has participated in the **Two days Hands-on Workshop** on **"LRa Gateway based SoC"** organized by the Department of Electronics and Commuication Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science andTechnology, Chennai, IEEE Madras Section, IEEE Circuits and Systems Society, Madras Chapter, IEEE Student Branch, Vel Tech, IEEE Circuits and Systems Society Student Branch Chapter, Vel Tech and Enthu Technology Solutions India Pvt Ltd, Coimbatore on 20.09.2023 and 21.09.2023.

Dr. K. Subramanian
Technical Lead
Enthu Technology Solutions

Dr. A. Selwin Mich Priyadharson
HoD-ECE

Dr. R. S. Valarmathi
DEAN-SoEC

Vel Tech
Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

COR^ Inphi

SCHOOL OF ELECTRICAL AND COMMUNICATI

DEPARTMENT OF ELECTRONICS & COMMUNICATION EINEERING

Certificate of Participation

This is to certify that Y. Ranjith Kumar [VTU23961] ,

III year ECE student of Vel Tech Rangarajan Dr. Sagunthal R&D Institute of Science and Technology has successfully completed the ***30 hors Value Added Course*** *on* ***"Exploration of Raspberry Pi for Embedde Applications"*** *organized by the* ***Department of Electronics*** *and* ***Communication Engineering*** *in association with* ***Inphi Corporation,*** *Chennai on 11.08.2023, 12.08.2023, 25.06.2023 & 26.08.2023 .*

Mr. Rajadurai Samuel
Senior Verification Engineer
Inphi Corportation

Dr. A. Selwin Mich Priya
HoD - ECE

R. S. Valarmathi
DEAN - SoEC


IEEE R10

NAAC A++

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Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

CORTINA Inphi Think Fast

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that B. Saikumar [VTU21050],

III year ECE student of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology has successfully completed the ***30 hours Value Added Course*** *on* ***"Exploration of Raspberry Pi for Embedded Applications"*** *organized by the* ***Department of Electronics and Communication Engineering*** *in association with* ***Inphi Corporation, Chennai*** *on 11.08.2023, 12.08.2023, 25.06.2023 & 26.08.2023 .*

Mr. Rajadurai Samuel
Senior Verification Engineer
Inphi Corporation

Dr. A. Selwin Mich Priyadharson
HoD - ECE

Dr. R. S. Valarmathi
DEAN - SoEC

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		**Course Handling Faculty :** Dr.G.Aloy Anuja Mary		
1	VTU19382	LIKHITHA	8.9	30
2	VTU20403	K HARSHITHA	9.05	29.5
3	VTU20619	GARRE SESHIKALA	8.5	28.5
4	VTU20769	HARSHANNJALI KANNE	8.5	29.5
5	VTU20780	MUPPARAJU ANUPRIYA	9.0	29.5
6	VTU20785	DUGGINENI LAKSHMI HARIKA	8.8	28
7	VTU20786	VANIPENTA KAVITHA SANJEEVANI	8.524	28
8	VTU20806	DADI NEHA	9.1	26
9	VTU21129	ROHIT KUMAR	9.1	28

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Motivated the students to participate in technical contests, Workshops, Solved Gate Problems to improve their academic performance.

Improvement/ Achievement of fast learners

Secured good marks in CIA tests and Surely will give their best in University Exam.

Faculty Signature **CC Signature** **HOD Signature**

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC112/Wireless Communication

Course Coordinator : Dr.T.Kavitha

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		Course Handling Faculty : Dr.G.Aloy Anuja Mary		
1	VTU19382	LIKHITHA	8.9	30
2	VTU20403	K HARSHITHA	9.05	29.5
3	VTU20619	GARRE SESHIKALA	8.5	28.5
4	VTU20769	HARSHANNJALI KANNE	8.5	29.5
5	VTU20780	MUPPARAJU ANUPRIYA	9.0	29.5
6	VTU20785	DUGGINENI LAKSHMI HARIKA	8.8	28
7	VTU20786	VANIPENTA KAVITHA SANJEEVANI	8.524	28
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B. Aloy
Faculty Signature

CC Signature

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

Certificate of Participation

This is to certify that ~~Mr.~~ / Ms. / ~~Dr.~~ DADI NEHA from ECE has participated in the three days' workshop on IoT (ESP32) from 14th – 16th September 2023 at the Centre of Excellence for IoT and Smart Factory Initiatives organized by Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

C.A

Dr. C. A. Arun
Head, Centre of Excellence for IoT and Smart Factory Initiatives

Dr. P. Chandrakumar
Dean Industry Relations

Prof. S. Salivahanan
Vice Chancellor

Virtual Internship Completion Certificate

This is to certify that

Harshanjali Kanne

Vel Tech Rangarajan Dr. Sagunthala R

has successfully completed

MathWorks Virtual Internship Program on

'Get started with Artificial Intelligence' during

May - September 2023

Supported by MathWorks

Dr. Buddha Chandrasekhar
Chief Co-ordinating Officer (CCO)
NEAT Cell, AICTE

Chandan Pramanik
Director, Education
MathWorks India

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		**Course Handling Faculty :** Dr. KALPANA DEVI P		
1.	VTU 21193	CH. ANJANI KUMAR	9.1	30
2.	VTU19883	P. LOGESWARI	8.87	27
3	VTU 21259	L.CHENNA KESAVA REDDY	8.6	27
4	VTU23975	P.PRASANNA KUMARI	8.5	27
5	VTU21140	B.VISHNUVARDHAN REDDY	8.7	29

Training / Activities Conducted for fast learners

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Faculty **Course Coordinator** **HOD/ECE**

Q.25 The open loop transfer function of a unity negative feedback system is $G(s) = \frac{K}{s(1+sT_1)(1+sT_2)}$, where K, T_1 and T_2 are positive constants. The phase cross over frequency, in rad/s, is

(a) $\frac{1}{\sqrt{T_1 T_2}}$ (b) $\frac{1}{T_1 T_2}$

(c) $\frac{1}{T_1\sqrt{T_2}}$ (d) $\frac{1}{T_2\sqrt{T_1}}$

[1 Mark : MCQ]

Ans. (a)

We know phase crossover frequency is that frequency at which phase of the open loop transfer function is $-180°$.

$$\therefore \quad G(s) = \frac{K}{s(1+sT_1)(1+sT_2)}$$

$$G(j\omega) = \frac{K}{(j\omega)(1+j\omega T_1)(1+j\omega T_2)}$$

$$\text{Phase of } G(j\omega) = \phi = -90 - \tan^{-1}(\omega T_1) - \tan^{-1}(\omega T_2)$$

$\therefore$ At $\omega = \omega_{pc}$, $\phi = -180$

$$\therefore \quad -180 = -90 - \tan^{-1}(\omega_{pc} T_1) - \tan^{-1}(\omega_{pc} T_2)$$

$$90 = \tan^{-1}(\omega_{pc} T_1) + \tan^{-1}(\omega_{pc} T_2)$$

$$\tan^{-1}\left(\frac{\omega_{pc}T_1 + \omega_{pc}T_2}{1-\omega_{pc}^2 T_1 T_2}\right) = 90$$

$$1 - \omega_{pc}^2 T_1 T_2 = 0$$

$$\omega_{pc} = \frac{1}{\sqrt{T_1 T_2}}$$

End of Solution

Q.26 Consider a system with input $x(t)$ and output $y(t) = x(e^t)$. The system is

(a) Causal and time invariant (b) Non-causal and time varying

(c) Causal and time varying (d) Non-causal and time invariant

[1 Mark : MCQ]

Ans. (b)

We have $y(t) = x(e^t)$

At $t = 0$

$$y(0) = x(1)$$

i.e. present value of output depends on future value of input, hence it is non-causal.

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code/Title : 10211EC112/Wireless Communication **Sec:F**

Course Coordinator : Dr.T.Kavitha **Date after T-I: 09.08.23**

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : F		Course Handling Faculty : S.Thenappan		
1	VTU19039	M VIGNESH	8.0	27.5
2	VTU20774	UPPARA ROHITH	8.5	27.5
3	VTU20905	BUGGAGARI SATISH	8.3	28.5
4	VTU21121	TIRUPATHI MOHITHA	7.93	28.5
5	VTU21123	KANDATI VYSHNAVI	8.3	28.5
6	VTU21163	CHINAGA HEMANJALI	8.1	27.5

Training / Activities Conducted for fast learners

Cisco Packet Tracer, Execution of Networking Commands, Software programming related tasks given to those students.

Active Learning method like Seminar discussion / Online tools learning can be conducted to motivate the students .

Improvement/ Achievement of fast learners

Students will achieve good grades (S/A) in the University Exam.

Faculty Signature **CC Signature** **HOD Signature**

Q.25 The open loop transfer function of a unity negative feedback system is $G(s) = \frac{k}{s(1+sT_1)(1+sT_2)}$, where k, T_1 and T_2 are positive constants. The phase cross-over frequency, in rad/s, is

(a) $\frac{1}{\sqrt{T_1 T_2}}$ (b) $\frac{1}{T_1 T_2}$

(c) $\frac{1}{T_1\sqrt{T_2}}$ (d) $\frac{1}{T_2\sqrt{T_1}}$

[1 Mark : MCQ]

Ans. (a)

We know phase crossover frequency is that frequency at which phase of the open loop transfer function is $-180°$.

$$\therefore \quad G(s) = \frac{K}{s(1+sT_1)(1+sT_2)}$$

$$G(j\omega) = \frac{K}{(j\omega)(1+j\omega T_1)(1+j\omega T_2)}$$

$$\text{Phase of } G(j\omega) = \phi = -90 - \tan^{-1}(\omega T_1) - \tan^{-1}(\omega T_2)$$

$\therefore$ At $\omega = \omega_{pc}$, $\phi = -180$

$$-180 = -90 - \tan^{-1}(\omega_{pc} T_1) - \tan^{-1}(\omega_{pc} T_2)$$

$$\therefore \quad 90 = \tan^{-1}(\omega_{pc} T_1) + \tan^{-1}(\omega_{pc} T_2)$$

$$\tan^{-1}\left(\frac{\omega_{pc}T_1 + \omega_{pc}T_2}{1-\omega_{pc}^2 T_1 T_2}\right) = 90$$

$$1 - \omega_{pc}^2 T_1 T_2 = 0$$

$$\omega_{pc} = \frac{1}{\sqrt{T_1 T_2}}$$

End of Solution

Q.26 Consider a system with input $x(t)$ and output $y(t) = x(e^t)$. The system is

(a) Causal and time invariant (b) Non-causal and time varying

(c) Causal and time varying (d) Non-causal and time invariant

[1 Mark : MCQ]

Ans. (b)

We have $y(t) = x(e^t)$

At $t = 0$

$$y(0) = x(1)$$

i.e. present value of output depends on future value of input, hence it is non-causal.

Q.25 The open loop transfer function of a unity negative feedback system is $G(s) = \frac{K}{s(1+sT_1)(1+sT_2)}$ where K, T_1 and T_2 are positive constants. The phase cross-over frequency, in rad/s, is

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(c) $\frac{1}{T_1\sqrt{T_2}}$ (d) $\frac{1}{T_2\sqrt{T_1}}$

[1 Mark : MCQ]

Ans (a)

We know phase crossover frequency is that frequency at which phase of the open loop transfer function is $-180°$

$$G(s) = \frac{K}{s(1+sT_1)(1+sT_2)}$$

$$G(j\omega) = \frac{K}{(j\omega)(1+j\omega T_1)(1+j\omega T_2)}$$

$$\text{Phase of } G(j\omega) = \phi = -90 - \tan^{-1}(\omega T_1) - \tan^{-1}(\omega T_2)$$

At $\omega = \omega_{pc}$, $\phi = -180$

$$-180 = -90 - \tan^{-1}(\omega_{pc} T_1) - \tan^{-1}(\omega_{pc} T_2)$$

$$90 = \tan^{-1}(\omega_{pc} T_1) + \tan^{-1}(\omega_{pc} T_2)$$

$$\tan^{-1}\left(\frac{\omega_{pc} T_1 + \omega_{pc} T_2}{1 - \omega_{pc}^2 T_1 T_2}\right) = 90$$

$$1 - \omega_{pc}^2 T_1 T_2 = 0$$

$$\omega_{pc} = \frac{1}{\sqrt{T_1 T_2}}$$

End of Solution

Q.26 Consider a system with input $x(t)$ and output $y(t) = x(e^t)$. The system is

(a) Causal and time invariant (b) Non-causal and time varying

(c) Causal and time varying (d) Non-causal and time invariant

[1 Mark : MCQ]

Ans (b)

We have $y(t) = x(e^t)$

At $t = 0$

$$y(0) = x(1)$$

i.e. present value of output depends on future value of input, hence it is non-causal.

...(i)

For Time Variant:

Delay the input,

$$y(t) = x(e^t - t_0) \quad \text{...(ii)}$$

Delay the output,

$$y(t - t_0) = x(e^{t-t_0})$$

i.e. equations (i) ≠ (ii)

Hence, it is time variant system.

End of Solution

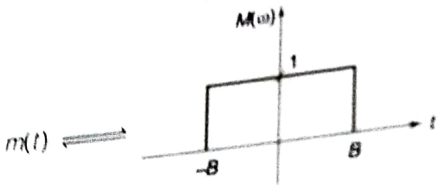
Q.27 Let $m(t)$ be a strictly band-limited signal with bandwidth B and energy E. Assuming $\omega_0 = 10B$, the energy in the signal $m(t)\cos\omega_0 t$ is

(a) $\frac{E}{4}$ (b) $\frac{E}{2}$

(c) E (d) $2E$

[1 Mark : MCQ]

Ans. (b)



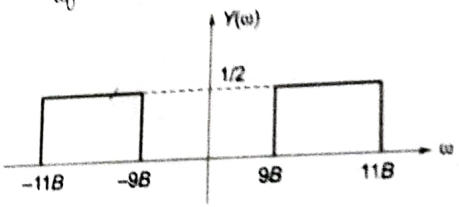
$$\text{Energy } (E) = \frac{1}{2\pi}\int_{-B}^{B}(1)^2 \cdot d\omega$$

$$E = \frac{B}{\pi}$$

Now, let $y(t) = m(t)\cos\omega_0 t$

$$Y(\omega) = \frac{1}{2}[M(\omega - \omega_0) + M(\omega + \omega_0)]$$

Here: $\omega_0 = 10B$



Now, $$\text{Energy } (E') = \frac{1}{2\pi}\int_{-\infty}^{\infty}|Y(\omega)|^2 \cdot d\omega$$

$$= \frac{1}{2\pi}\left[\int_{-11B}^{-9B}\left(\frac{1}{2}\right)^2 \cdot d\omega + \int_{9B}^{11B}\left(\frac{1}{2}\right)^2 \cdot d\omega\right]$$

$$= \frac{1}{2\pi}\left[\frac{1}{4}\times 2B + \frac{1}{4}\times 2B\right]$$

$$E' = \frac{B}{2\pi} = \frac{1}{2}\left(\frac{B}{\pi}\right) = \frac{E}{2}$$

End of Solution

Q.28 The Fourier transform $X(\omega)$ of $x(t) = e^{-t^2}$ is

Note: $\int_{-\infty}^{\infty} e^{-y^2}\,dy = \sqrt{\pi}$

(a) $\sqrt{\pi}\, e^{\frac{\omega^2}{2}}$

(b) $\dfrac{e^{-\frac{\omega^2}{4}}}{2\sqrt{\pi}}$

(c) $\sqrt{\pi}\, e^{-\frac{\omega^2}{4}}$

(d) $\sqrt{\pi}\, e^{-\frac{\omega^2}{2}}$

[1 Mark : MCQ]

Ans. (c)

We know; $e^{-at^2};\ a > 0 \xrightleftharpoons{FT} \sqrt{\dfrac{\pi}{a}} \cdot e^{-\omega^2/4a}$

Here; $a = 1$

$\therefore$ $X(\omega) = \sqrt{\pi} \cdot e^{-\omega^2/4}$

End of Solution

Q.29 In the table shown below, match the signal type with its spectral characteristics.

Signal type	Spectral Characteristics
(i) Continuous, aperiodic	**(a)** Continuous, aperiodic
(ii) Continuous, periodic	**(b)** Continuous, periodic
(iii) Discrete, aperiodic	**(c)** Discrete, aperiodic
(iv) Discrete, periodic	**(d)** Discrete, periodic

(a) (i) → (a), (ii) → (b), (iii) → (c), (iv) → (d)
(b) (i) → (a), (ii) → (c), (iii) → (b), (iv) → (d)
(c) (i) → (d), (ii) → (b), (iii) → (c), (iv) → (a)
(d) (i) → (a), (ii) → (c), (iii) → (d), (iv) → (b)

[1 Mark : MCQ]

Ans. (b)

Signal Types	Spectral Characteristics
• Continuous and aperiodic	• Aperiodic and continuous
• Continuous and periodic	• Aperiodic and discrete
• Discrete and aperiodic	• Periodic and continuous
• Discrete and periodic	• Periodic and discrete

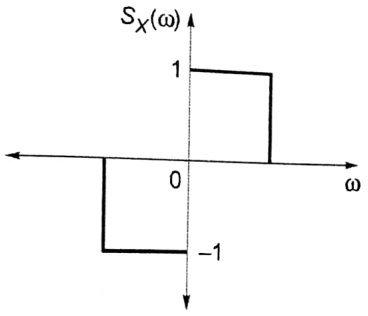
End of Solution

Q.30 For a real signal, which of the following is/are valid power spectral density/densities?

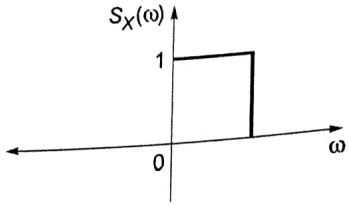
(a) $S_X(\omega) = \dfrac{2}{9+\omega^2}$

(b) $S_X(\omega) = e^{-\omega^2}\cos^2\omega$

(c)



(d)



[1 Mark : MSQ]

Ans. (a, b)

(i) $S_x(\omega) \geq 0$

(ii) $S_x(\omega)$ is even function

Hence, options (a) and (b) are valid power spectral densities.

End of Solution

Q.31 The signal-to-noise ratio (SNR) of an ADC with a full-scale sinusoidal input is given to be 61.96 dB. The resolution of the ADC is _____ bits. (rounded off to the nearest integer).

[1 Mark : NAT]

Ans. (10)

We know that for sinusoidal input, the signal to noise ratio (SNR) is given as,

$$\text{SNR} = 1.76 + 6.02\,n \text{ dB}$$

$$61.96 \text{ dB} = 1.76 + 6.02\,n \text{ dB}$$

$$6.02\,n = 61.96 - 1.76$$

$$n = 10 \text{ bits}$$

$\therefore$

End of Solution

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		**Course Handling Faculty :** Dr. Sahaya Sheela M		
1.	VTU21098	S V L Sai Neha	9.1	30
2.	VTU20515	Muthyaboina Akshitha	8.8	25
3.	VTU18996	Guda Venkata Supraja	8.89	28.5
4.	VTU20117	Miriyam Sri Vaishnavi	8.8	29

Training / Activities Conducted for fast learners

- Planned to solve more gate problems in wireless communication.
- Motivated the students to participate in project contest.
- Motivated the students to present paper in IEEE Conferences.
- Planned to attend seminar or workshop related to wireless communication.

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Secured good marks in CIA tests and surely will give their best in University Exam.

Faculty **Course Coordinator** **HOD/ECE**

Vel Tech
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R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

25 Vel Tech

'A++ Grade'

ACE

Certificate of Participation

This is to Certify that Mr. / Ms. G. VENKATA SUPRAJA VTU18996
of II *has participated in the event titled* CREATIVE MIND, *organized by the Association of Communication Engineers, Department of ECE, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, held on* 06.04.2023.

Incharge
...rshia

Club Coordinator Head
Dr.V. Koushick

HOD-ECE
Dr. P.Esther Rani

DEAN-SOEC
Dr.R. S. Valarmathi

VIT CHENNAI
TECHNOVIT
"Light of the future, AI"

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

BANDVIT

CERTIFICATE OF PARTICIPATION

This is to certify that Mr./Ms./Prof./Dr. ***Guda Venkata supraja*** *of* ***Veltech University*** *has participated in the event titled* ***Innoventure - Team of 3*** *organized by* ***technoVIT'23*** *under the* ***School of Electronics Engineering*** *Vellore Institute of Technology, Chennai on* ***06-10-2023***

Dr.Vijayakumar P/ Dr.Karmel A
Co-Convenor

Dr.Bharathiraja S
Co-Convenor /Asst. Director
Student Welfare

Dr.V.Rajasekaran
Director
Student Welfare

Dr.V.S.Kanchana Bhaaskaran
Pro-Vice Chancellor

VIT- A Place to learn; A chance to grow

NAAC A++

Vel Tech Rangarajan Dr. Sagunthala R&D Institute

CORTINA

SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that SVL Sai Neha [VTU21098] ,

III year ECE student of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology has successfully completed the ***30 hours Value Added Course*** *on* ***"Exploration of Raspberry Pi for Embedded Applications"*** *organized by the* ***Department of Electronics and Communication Engineering*** *in association with* ***Inphi Corporation, Chennai*** *on 11.08.2023, 12.08.2023, 25.06.2023 & 26.08.2023 .*

Mr. Rajadurai Samuel
Senior Verification Engineer
Inphi Corportation

Dr. A. Selwin Mich Priyadharson
HoD - ECE

Dr. R. S. Valarmathi
DEAN - SoEC

WhatsApp Image 2023-11-22 at 14.34.09.jpeg

Vel Tech

Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University u/s 3 of UGC Act, 1956)

25 Vel Tech

Certificate of Participation

This is to certify that ~~Mr.~~ / Ms. / ~~Dr.~~ MIRIYAM SRI VAISHNAVI from III/ECE has participated in the three days' workshop on IoT (ESP32) from 13th – 15th July 2023 at the Centre of Excellence for IoT and Smart Factory Initiatives organized by Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

Dr. C. A. Arun
Head, Centre of Excellence for IoT and Smart Factory Initiatives

Dr. P. Chandrakumar
Dean Industry Relations

Prof. S. Salivahanan
Vice Chancellor

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC112/ Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : H		**Course Handling Faculty :Dr. I. Nandhini**		**TTS No:3737**
1.	VTU18975	SANTHOSH S	A	28
2.	VTU21007	PRIYANSI	A	29
3.	VTU21008	KHUSBHU KUMARI	A	29.5
4.	VTU21198	PASUPULETI SURYA	A	30
5.	VTU20983	VADAPELLI RAM DHEERAJ	A	27
6.	VTU19026	A D NEERAJ KUMAR	A	29.5
7.	VTU20700	M KABILESAN	A	28.5
8.	VTU21484	RAJIV CHAURASIYA	A	28
9.	VTU20971	MARUPUTI NAGA JYOTHI	A	28
10.	VTU21262	EDA MOUNIKA	A	27

Training / Activities Conducted for fast learners

- Planned to solve more GATE questions & problems in Wireless Communication.
- Planned to attend seminar, workshop, conferences related to Wireless Communication.

Criteria for fast learners:CGPA greater than 8.5 and Test 1 greater than 24

Improvement/ Achievement of fast learners

Observed more inclination towards problem solving

Faculty Signature **CC Signature** **HOD Signature**

Q. No. 1 – 25 Carry One Mark Each

1. Consider the following statements regarding the complex Poynting vector $\vec{P}$ for the power radiated by a point source in an infinite homogeneous and lossless medium. $\mathrm{Re}(\vec{P})$ denotes the real part of $\vec{P}$. S denotes a spherical surface whose centre is at the point source, and $\hat{n}$ denotes the unit surface normal on S. Which of the following statements is **TRUE**?

(A) $\mathrm{Re}(\vec{P})$ remains constant at any radial distance from the source

(B) $\mathrm{Re}(\vec{P})$ increases with increasing radial distance from the source

(C) $\oiint_S \mathrm{Re}(\vec{P}).\hat{n}\,dS$ remains constant at any radial distance from the source

(D) $\oiint_S \mathrm{Re}(\vec{P}).\hat{n}\,dS$ decreases with increasing radial distance form the source

Answer: - (D)

Exp: - $\oiint_S \mathrm{Re}(\vec{P}).\hat{n}ds$ gives average power and it decreases with increasing radial distance from the source

2. A transmission line of characteristic impedance 50Ω is terminated by a 50Ω load. When excited by a sinusoidal voltage source at 10GHz, the phase difference between two points spaced 2mm apart on the line is found to be $\frac{\pi}{4}$ radians. The phase velocity of the wave along the line is

(A) $0.8\times10^8 m/s$ (B) $1.2\times10^8 m/s$ (C) $1.6\times10^8 m/s$ (D) $3\times10^8 m/s$

Answer: - (C)

Exp: - $Z_0 = 50\Omega$; $Z_L = 50\Omega$

For $\frac{\pi}{4}$ radians the distance is 2mm

The phase velocity $v_p = \frac{\omega}{\beta} = \frac{2\times\pi\times10^{10}}{\frac{2\pi}{16\times10^{-3}}} = 16\times10^{-7} = 1.6\times10^8 m/s$

3. An analog signal is band-limited to 4kHz, sampled at the Nyquist rate and the samples are quantized into 4 levels. The quantized levels are assumed to be independent and equally probable. If we transmit two quantized samples per second, the information rate is _____ bits / second.

(A) 1 (B) 2 (C) 3 (D) 4

Answer: - (D)

Exp: - Since two samples are transmitted and each sample has 2 bits of information, then the information rate is 4 bits/sec.

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Vel Tech
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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : I		**Course Handling Faculty :** Dr. Uganya G		
1.	VTU19205	B Priyanka	8.5	24
2.	VTU20369	Padigapati Vandana	8.8	26

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Motivated the students to attend seminar or online course related to wireless communication.
- Planned to solve more gate problems in wireless communication.

Improvement/ Achievement of fast learners

- Secured good marks in CIA tests and surely will give their best in University Exam.

G. Uganya
Faculty

Course Coordinator

HOD/ECE

MathWorks | *Training Services*

Course Completion Certificate

B. Priyanka

has successfully completed **100%** of the self-paced training course

Wireless Communications Onramp

Craig T. Santos

DIRECTOR, TRAINING SERVICES

12 October 2023

MathWorks | *Training Services*

Course Completion Certificate

Vandana Reddy

has successfully completed **100%** of the self-paced training course

Wireless Communications Onramp

DIRECTOR, TRAINING SERVICES

16 October 2023

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC112/ Wireless Communication

Course Coordinator : Dr D.Ferlin Deva Shahila

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : J		**Course Handling Faculty : Dr D.Ferlin Deva Shahila**		
1	VTU21245	POTHA GEETHIKA	8.4	27
2	VTU21000	TIRUMALASETTY MOHITH NAG	8.4	24

Training / Activities Conducted for fast learners

- Motivated to solve GATE questions on signals and systems
- MATLAB on ramp activity

Criteria for fast learners: CGPA greater than 8.4 and Test 1 greater than 24

Improvement/ Achievement of fast learners

The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions.

Faculty Signature **CC Signature** **HOD Signature**

MathWorks® | *Training Services*

Course Completion Certificate

Geethika Geethu

has successfully completed **100%** of the self-paced training course

MATLAB Programming Techniques

DIRECTOR, TRAINING SERVICES

26 October 2023

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Course Completion Certificate

Geethika Geethu

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MATLAB Onramp

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25 October 2023

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Course Completion Certificate

Geethika Geethu

has successfully completed **100%** of the self-paced training course

MATLAB Fundamentals

DIRECTOR, TRAINING SERVICES

25 October 2023

WIRELESS COMMUNICATION - I

"GATE QUESTIONS"

By :- NAME :- T. Mohith Nag

VTU NO. :- VTU21000

Reg. No :- 21UEE10105

Consider a wireless communication link between a transmitter and a receiver located in free space, with finite and strictly positive capacity. If the effective areas of the transmitter & the receiver antennas, and the distance between them all doubled, and everything else remains unchanged, the maximum capacity of the wireless link

1. increases by a factor of 2
2. decreases by a factor of 2
3. remains unchanged
4. Decrease By a factor of $\sqrt{2}$

Concept:-

The capacity of a wireless link is given by Shanon Hartley theorem as:

$$C = B\log_2\left(1+\frac{S}{N}\right)$$

Channel capacity depends on $\left(\frac{S}{N}\right)$, and hence on 'S'

S = Received power at the receiver = P_r

$$S = P_r = \frac{P_t G_t G_r}{\left(\frac{4\pi R}{\lambda}\right)^2}$$

$$= \frac{P_t\left(\frac{4\pi}{\lambda^2} A_{te}\right)\left(\frac{4\pi}{\lambda^2} A_{re}\right)}{\left(\frac{4\pi R}{\lambda}\right)^2}$$

Calculation:

It is given,

$$A_{te}' = 2A_{te}$$

$$A_{re}' = 2A_{re}$$

$$R' = 2R$$

$$P_r' = \frac{P_t \left(\frac{4\pi A_{te}}{\lambda^2}\right)\left(\frac{4\pi}{\lambda^2} A_{re}\right) 2 \times 2}{\left(\frac{4\pi R}{\lambda}\right)^2 (2)^2}$$

$$P_r' = P_r$$

$$S' = S$$

$$\frac{S'}{N} = \frac{S}{N}$$

$$\Rightarrow C' = C_r \quad \text{i.e.}$$

The Maximum Capacity of the channel remains unchanged.

A certain city has an area of 1,300 square miles and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 miles and the city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 kHz. Assume a GOS of 2% for an Erlang B system is specified. If the offered traffic per user is 0.03 Erlangs, compute (a) the number of cells in the service area, (b) the number of channels

(c) Traffic intensity of each cell. (d) the Maximum carried traffic. (e) the total number of users that can be served for 2% GOS. (f) the number of mobiles per channel, and (g) the theoretical maximum number of users that could be served at one time by the system.

Solution:-

(a) Given:

Total coverage area = 1300 miles

Cell radius = 4 miles

The area of a cell (hexagon) can be shown to be $2.5981 R^2$, thus each cell covers

$$2.5981 \times (4)^2 = 41.57 \text{ sq mi}$$

Hence, the total no. of cells are $N_c = 1300/41.37 = 31$ cells

(b) The total no. of channel per cell (c)

= allocated spectrum / (channel width * frequency reuse factor)

= $40{,}000{,}000 / (60{,}000 \times 7) = 95$ channels/cell

(c) Given:

$C = 95$, and GOS = 0.02

From the Erlang B chart, we have

traffic intensity per cell $A = 84$ Erlangs/cell

(d) Maximum Carried traffic = no. of cells × traffic intensity per cell

= 31 × 84 = 2604 Erlangs

(e) Given traffic per User = 0.03 Erlangs

Total no. of users = Total traffic / traffic per User

= 2604 / 0.03 = 86,800 users.

(f) No. of Mobiles per channel = no. of users / no. of channels

= 86,800 / 666 = 130 mobiles / channel.

(g) The theoretical maximum no. of served mobiles is the no. of available channels in the system

= C × Nc = 95 × 31 = 2945 users, which is 3.4% of the customer base.

A Hexagonal cell within a 4-cell system has a radius of 1.387km. A total of a channels are used within the entire system. If the Load per User is 0.02 Erlangs, and λ=1 call/hour, Compute the following for an Erlang C system that has a 5% probability of a delayed call:

(a) How Many users per Square kilometer will this system support?

(b) what is the probability that a delayed call will have to wait for more than 10s?

(c) what is the probability that a call will be delayed for more than 10 second.

Solution :

Given

Cell radius, $R = 1.387$ km

Area covered per cell is $2.598 \times (1.387)^2 = 5$ sq km

No. of cells per cluster = 4

Total no of channels = 60

Therefore, no. of channels per cell = $60/4 = 15$ channels

(a) From Erlang C chart, for 5% probability of delay with $C=15$,

traffic intensity = 9.0 Erlangs

Therefore, No. of users = Total traffic intensity / traffic per user

$= 9.0/0.029 = 310$ users

$= 310$ users $/ 5$ sq km $= 62$ users/sq km

(b) Given $\lambda = 1$, holding time

$$H = A_u / \lambda = 0.029 \text{ hour} = 104.4 \text{ seconds}$$

The Probability that a delayed call will have to wait for more than 10s is

$$Pr[\text{delay} > t \mid \text{delay}] = \exp(-(C-A)t/H)$$

$$= \exp(-(15-9.0)10/104.4) = 56.29\%$$

(c) Given $Pr[\text{delay} > 0] = 5\% = 0.05$

Probability that a call is delayed more than 10 sec

$$Pr[\text{delay} > 10] = Pr[\text{delay} > 0] \, Pr[\text{delay} > t \mid \text{delay}]$$

$$= 0.05 \times 0.5629 = 2.81\%$$

Wireless Communication

Gate Questions

Name :- P. Geethika

VTU Number :- VTU21245

Consider a wireless communication link between a Transmitter and a receiver located in free space, with finite and strictly positive capacity. If the effective areas of the Transmitter and the Receiver Antennas, and the distance between them are all Doubled, and everything else remain unchange the maximum capacity of the wireless links.

1. Increased by a factor of 2
2. Decreased by a factor of 2
3. remains unchanged
4. Decreases by a factor of $\sqrt{2}$

The capacity of a wireless link is given by Shanon Hartley theorem as:

$$C = B\log_2(1 + S/N)$$

channel capacity Depends on (S/N), and hence on S.

S = Received power at the Receiver = P_r

$$S = P_r = \frac{P_t G_t G_r}{\left(\frac{4\pi R}{\lambda}\right)^2}.$$

$$= \frac{P_t\left(\frac{4\pi}{\lambda^2} A_{te}\right)\left(\frac{4\pi}{\lambda^2} A_{re}\right)}{\left(\frac{4\pi R}{\lambda}\right)^2}$$

It is given,

$A_{te}' = 2A_{te}$

$A_{re}' = 2A_{re}$

$R' = 2R$

$$P_r' = \frac{P_t\left(\frac{4\pi A_{te}}{\lambda^2}\right)\left(\frac{4\pi}{\lambda^2} A_{re}\right) 2 \times 2}{\left(\frac{4\pi R}{\lambda}\right)^2 (2)^2}$$

$$P_r' = \frac{P_t\left(\frac{4\pi A_{te}}{\lambda^2}\right)\left(\frac{4\pi}{\lambda^2} A_{re}\right) 4}{\left(\frac{4\pi R}{\lambda}\right)^2 (2)^2}$$

$P_r' = P_r$; $S' = S$

$S'/N = S/N \Rightarrow C' = C_1$

i.e. the maximum capacity of the channel remains unchanged.

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTRUGE 2021 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC112 / Wireless Communication

Course Coordinator : Dr. Kavitha T

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : L		**Course Handling Faculty :** Dr.C.Ezhilazhagan		
1.	VTU20862	Aditya Sharma	8.5	26

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

Faculty Dr.C.Ezhilazhagan

Course Coordinator

HOD/ECE

MathWorks | *Training Services*

Course Completion Certificate

Aditya Sharma

has successfully completed **100%** of the self-paced training course

Deep Learning Onramp

DIRECTOR, TRAINING SERVICES

3 October 2023

MathWorks | *Training Services*

Course Completion Certificate

Aditya Sharma

has successfully completed **100%** of the self-paced training course

MATLAB Programming Techniques

DIRECTOR, TRAINING SERVICES

14 June 2023

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		**Course Handling Faculty : Dr. M. Anto Bennet**		
1.	Nil	Nil	-	-

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Faculty Signature **Course Coordinator** **HOD/ECE**

VIT CHENNAI
TECHNOVIT
"Light of the future, AI"

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act 1956)
CHENNAI

BANDVIT

CERTIFICATE OF PARTICIPATION

This is to certify that Mr./Ms./Prof./Dr. **Guda Venkata supraja** *of* **Veltech University** *has participated in the event titled* **Innoventure - Team of 3** *organized by technoVIT'23 under the* **School of Electronics Engineering** *Vellore Institute of Technology, Chennai on* **06-10-2023**

Dr.Vijayakumar P/ Dr.Karmel A
Co-Convenor

Dr.Bharathiraja S
Co-Convenor /Asst. Director
Student Welfare

Dr.V.Rajasekaran
Director
Student Welfare

Dr.V.S.Kanchana Bhaaskaran
Pro-Vice Chancellor

VIT- A Place to learn; A chance to grow

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC113/Antenna Theory

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test II
Section : B		**Course Handling Faculty : Dr.Beulah Jackson**		
1.	VTU18996	GUDA VENKATA SUPRAJA	8.5	25

Criteria for fast learners: CGPA greater than 8.5 and Test-1 greater than 24

Training / Activities Conducted for fast learners

Motivated the student to participate in cocurricular and extra curricular activities.

Improvement/ Achievement of fast learners

Student has participated in technical event conducted by VIT.

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC113/Antenna Theory

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test II
Section : B		Course Handling Faculty : Dr.Beulah Jackson		
1.	VTU18996	GUDA VENKATA SUPRAJA	8.5	25

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Training / Activities Conducted for fast learners

Motivated the student to participate in cocurricular and extra curricular activities.

Improvement/ Achievement of fast learners

Student has participated in technical event conducted by VIT.

Faculty Signature

CC Signature

HOD Signature

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC113 – Antenna Theory

Course Coordinator : Dr M Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : C		Course Handling Faculty : Dr C Kanmani Pappa		
1.	VTU19382	A LIKHITHA	8.8	29
2.	VTU20117	MIRIYAM SRI VAISHNAVI	8.79	28
3.	VTU20903	AKULA LOKESH	8.5	30
4.	VTU20908	BALPUNURI SAKETH REDDY	8.9	30
5.	VTU20938	PUTTURU SAI MOKSHITHA	8.8	30
6.	VTU23960	MADITHATI SIVA CHANDRA LEKHA	8.8	30
7.	VTU24010	KATAMREDDY POOJITHA REDDY	8.9	30

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Training / Activities Conducted for fast learners

- Students were trained to practice Gate Questions in Electromagnetic Fields.
- Students were motivated to write Gate Exams

Improvement/ Achievement of fast learners

Students were able to solve previous year Gate Questions

Faculty Signature **CC Signature** **HOD Signature**

Antenna Theory

K. Pagitha reddy
VTU24010

Consider a lossless antenna with a directive gain of +6dB. If 1m W of power is fed to it the total power radiated by the antenna will be

A. 4mW
B. 1mW
C. 7mW
D. 1/4mW

The line of sight communication requires transmit and receive antennas to face each other. If the transmit antenna is vertically polarized for best reception the receiver antenna should be

A. horizontally polarized.
B. vertically polarized.
C. at 45° with respect to horizantal polarization.
D. at 45° with respect to vertical polarization.

If the diameter of a $\lambda/2$ dipole antenna is increased from $\lambda/100$ to $\lambda/50$ then is

A. bandwidth increases.
B. bandwidth decreases.
C. Gain increases.
D. Gain decreases.

4. An antenna in free space receives 2μW of power when the incident electric field is 20mV/m rms. The effective aperture of the antenna is

A. $0.005m^2$

B. $0.05m^2$

C. $1.885\ m^2$

D. $3.77\ m^2$

5. The radiation resistance of a circular loop of one turn is $0.01\ \Omega$. The radiation resistance of five turns of such a loop will be

A. 0.002Ω

B. 0.01Ω

C. 0.05Ω

D. 0.25Ω

6. The far field of an antenna varies with distance r as

A. $1/r$

B. $1/r^2$

C. $1/r^3$

D. $\frac{1}{\sqrt{r}}$

vector H in the far field of an antenna is fields

A. $\nabla \cdot \vec{H} = 0$ and $\nabla \times \vec{H} = 0$

B. $\nabla \cdot \vec{H} \neq 0$ and $\nabla \times \vec{H} \neq 0$

C. $\nabla \cdot \vec{H} = 0$ and $\nabla \times \vec{H} \neq 0$

D. $\nabla \cdot \vec{H} \neq 0$ and $\nabla \times \vec{H} = 0$

An antenna when radiating, has a highly directional radiation pattern. when the antenna is receiving its radiation pattern.

A. is more directive

B. is less directive

C. is the same

D. exhibits no directivity at all.

1. The beam width - between - first - null of a uniform linear array of N equally spaced equally excited antennas is determined by

A. N alone and not by d.

B. d alone and not by N.

C. the ratio (N/d).

D. the product (Nd).

10. In a broard side array of 20 isotropic radiators equally spaced at a distance of $\lambda/2$, the beam width between first nulls is

A. 51.3 degrees

B. 11.46 degrees

C. 22.9 degrees

D. 102.6 degrees

10. In a broard side array of 20 isotropic radiators equally spaced at a distance of $\lambda/2$, the veam width between first nulls is

A. 51.3 degrees

B. 11.46 degrees

C. 22.9 degrees

D. 102.6 degrees

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DEPARTMENT OF ECE

VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title: **10211EC113 ANTENNA THEORY**

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : **D sec**		Course Handling Faculty : **Dr.M.ANANDAN**		
1	**VTU21007**	**PRIYANSI**	**9.2**	**25**
2	**VTU21108**	**KHUSHBU KUMARI**	**8.6**	**27**
3	**VTU21129**	**ROHIT KUMAR**	**9.4**	**28**

Training / Activities Conducted for fast learners

- *.Gate Questions given*
- *Encourage to participate in Smart India Hackathan 2023*

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

Shortlisted in Internal Smart India Hackathon 2023and participate in Smart India Hackathan 2023

Faculty Signature **CC Signature** **HOD Signature**

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE

SUMMER SEMESTER – (2023 – 2024)

ACTIVITIES CONDUCTED FOR FAST LEARNERS

- Motivated fast learners to get University ranks
- Encouraged students to take up competitive exams like GATE, GRE, TOEFL,IELTS, CAT, PGCET etc
- Also provided opportunities to develop their creativity by participating andorganizing intercollegiate as well as National level technical symposiums

Other Activities / Training Conducted for Fast Learners:

- Placement oriented activities – Technical round HR questions discussed
- Advised them to participate in national level conference
- Guide them to publish papers in journals
- Mock interviews

Online Resources link:

For Placement preparation:

1. https://prepinsta.com/
2. https://www.geeksforgeeks.org/

For GATE Preparation:

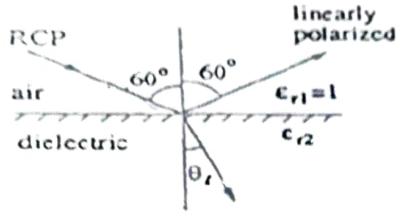
1. http://www.educationobserver.com/forum/attachment.php?aid=4136
2. https://www.youtube.com/c/GATEMATICEducation/about

GATE EXAM QUESTIONS

Question asked in the previous years of GATE ECE.

1. The dominant mode in a rectanglar waveguide is TE_{10}, because this mode has GATE 2001
   A. No Attenuation B. No Cut off
   C. No Magnetic field Component D. The highest cut off wavelength

2. A circularly polarizes (RCP) plane wave is incident at an angle of 60° to the normal, on an air - dielectric interface. If the reflected wave is linearly polarized, the relative dielectric constant ε_{r2} is (GATE 2007)



A. $\sqrt{2}$ B. $\sqrt{3}$ C.2 D.3

3. The VSWR can have any value between (GATE 2002)
   A. 0 and 1 B. -1 and +1 C.0 and x D. 1 and ∞

4. A Transmission line of characteristic impedance 50W is terminated in a load impedance Z_L .The VSWR of the line is measured as 5 and the first of the voltage maxima in the line is observed at a distance of $\lambda / 4$ from the load. The value of Z_L is (GATE 2011)
   A. 10 Ω B. 250 Ω C.(19.23 + j46.15) Ω D. (19.23- j46.15) Ω

5. If a plane electromagnetic wave satisfies the equation $\frac{\partial^2 E_x}{\partial z^2} = c^2 \frac{\partial^2 E_x}{\partial t^2}$, the wave propagation in the GATE 2001
   A. x - direction B. z - direction
   C. y - direction D. xy plane at angle of 45° between the x and z directions

6. The phase velocity of waves propagating in a hollow metal waveguide is GATE 2001
   A. Greater than the velocity of light in free space B. Less than the velocity of light in free space
   C. Equal to the velocity of light in free space D. Equal to the group velocity.

7. The electric field of a plane wave propagating in a loss less non magnetic medium is given by the

$$E(z,t) = a_x\, 5\, \cos(2\pi \times 10^9 t + \beta z) + a_y\, 3\, \cos\left(2\pi \times 10^9 t + \beta z - \frac{\pi}{2}\right)$$

   following expression GATE 2015
   The type of the polarization is
   A. Right Hand circular B. Left Hand Elliptical
   C. Right Hand Elliptical D. Linear

8. The return loss of a device is found to be 20 dB. The voltage standing wave ratio (VSWR) and magnitude of reflection coefficient are respectively GATE 2013
   A. 1.22 and 0.1 B. 0.81 and 0.1 C. -1.22 and 0.1 D. 2.44 and 0.2

Ans:

1.D 2.D 3.D 4.A 5.B 6.A 7.B 8.A

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC113 & Antenna Theory

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		**Course Handling Faculty :** Dr. J. Josephine Pon Gloria		
1.	Nil	Nil	-	-

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Faculty Signature **Course Coordinator** **HOD/ECE**

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R&D Institute of Science and Technology
(Deemed to be University Estd u/s 3 of UGC Act 1956)

List of Fast Learners – Action Planned Report

Course Title : Antenna Theory

Course Code : **10213EC104**

Semester : Summer

Date after T1 : 16.08.2023

Academic Year: 2023-2024

Course Coordinator :Dr. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA
			Unit Test I
Section : I		**Course Handling Faculty : Dr. V. Prithivirajan**	
NIL			

Criteria for fast learners: CGPA greater than 8.5 and UT1 greater than 8

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

Faculty

Course Coordinator

HOD

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R&D Institute of Science and Technology

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTUR UGE - 2021 B. TECH – ECE
SUMMER 2023 – 2024

FAST LEARNERS LIST (PROOF)

Course Code & Title : 10211EC114 & Antenna Theory

Course Coordinator : Dr.M.Anto Bennet

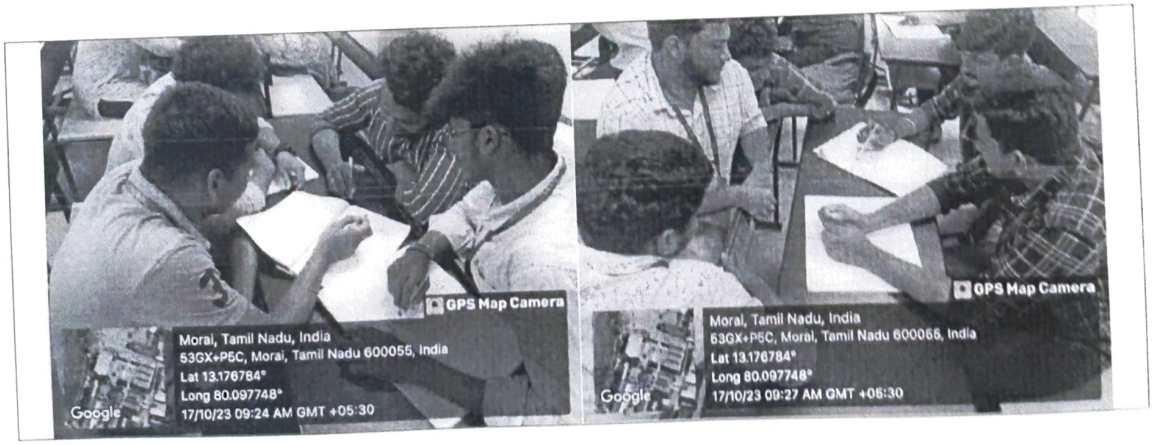
S.No.	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : J		**Course Handling Faculty : Dr. Bikash Ranjan Behera**		
1	20150	NARRA BALAJI		30
2	20645	GIDUTURI BALA BHAVITHA		27
3	21068	GOVINDU YASWANTH KUMAR		27

Training/Activities Conducted for Fast Learners

- Motivated to students to participate in Smart India Hackathon and other technical events.
- Conducted group discussion where these students acted as mentors and they motivated their classmates.

Improvement/Achievement of Fast Learners

- The knowledge gained in the participation of events will help the students in building confidence and grooming their personal skills.



Course Handling Faculty **Course Coordinator** **HOD ECE**

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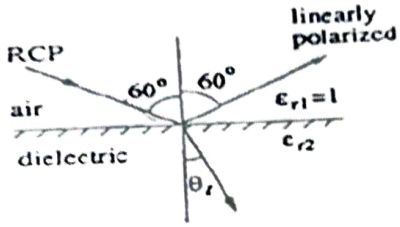

A.$\sqrt{2}$ B. $\sqrt{3}$ C.2 D.3

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Ans:

1.D 2.D 3.D 4.A 5.B 6.A 7.B 8.A

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE

SUMMER SEMESTER – (2023 – 2024)

ACTIVITIES CONDUCTED FOR FAST LEARNERS

- Motivated fast learners to get University ranks
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2. https://www.youtube.com/c/GATEMATICEducation/about

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List of Fast Learners – Action Planned Report

Course Title : Antenna Theory

Course Code : 10211EC113

Semester :Summer

Date after T1 : 14.08.2023

Academic Year: 2023-2024

Course Coordinator :Dr.Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA
			Unit Test I
Section : K		**Course Handling Faculty : D.Rajesh Kumar**	
1	VTU20769	HARSHANNJALI KANNE	26
2	VTU21121	TIRUPATHI MOHITHA	26
3	VTU21123	KANDATI VYSHNAVI	28.5
4	VTU20468	GUDURU NANDHINI	25
5	VTU20757	DEGALA DURGA RAJENDRA	26.5

Criteria for fast learners: CGPA greater than 8.5 and UT1 greater than 8

Training / Activities Conducted for fast learners

Quiz on GATE Questions

Improvement/ Achievement of fast learners

Instructed to register for upcoming GATE exams

D. Rajesh

Faculty

Course Coordinator

HOD

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Mid Term Test I
Section : B		Course Handling Faculty : Dr.G.Sasikala		
1	VTU20785	DUGGINENI LAKSHMI HARIKA	8.5	19
2	VTU20945	PAMMI ANJIREDDY	8.8	18.5
3	VTU19421	NAGISETTY NAGA SAIRAM	8.7	18.5
4	VTU18973	JAVVAJI SHAMVIDA	8.8	18.5

Training / Activities Conducted for fast learners:

- Motivated to participate technical events like SIH,Project Expo etc.

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners:

- Performances of the students were good.

Faculty Signature

CC Signature

HOD Signature

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : D		**Course Handling Faculty :** Dr. B. Sathyasri		
1	NIL			
2				
3				
4				

Training / Activities Conducted for fast learners

Nil

Improvement/ Achievement of fast learners

Nil

Faculty Signature

CC Signature

HOD Signature

22-5

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title: 10211EC202-Internet of Things

Course Coordinator: Dr. Kanmani Ruby

S. No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section: J		**Course Handling Faculty:** Dr. M. Sathesh		
1		NIL		

Criteria for fast learners:

Training / Activities Conducted for fast learners.
—

Improvement/ Achievement of fast learners
—

Dr. M. Sathesh.

Faculty Signature **CC Signature** **HOD Signature**

22-A

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Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		Course Handling Faculty : Dr.E.D. Kanmani Ruby		
1	NIL			
2				
3				
4				

Training / Activities Conducted for fast learners

Nil

Improvement/ Achievement of fast learners

Nil

Faculty Signature **CC Signature** **HOD Signature**

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(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

22-E

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10211EC202 / Internet of Things

Course Coordinator : Dr.E.D. Kanmani Ruby

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : E		**Course Handling Faculty :** Dr. S. Oudaya coumar		
1	NIL			
2				
3				
4				

Training / Activities Conducted for fast learners

Nil

Improvement/ Achievement of fast learners

Nil

Faculty Signature

CC Signature

HOD Signature

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21 B.TECH – ECE
Summer 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10212EC213/Digital Image and Video Processing

Course Coordinator : Dr. C.Raja

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Unit Test I
Section : A		Course Handling Faculty : Dr. J.Nirmal Jothi		
		Nil		

Training / Activities Conducted for fast learners

Criteria for fast learners: CGPA greater than 8.5 and Test1 greater than 24

Improvement/ Achievement of fast learners

Faculty **CC** **HOD**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTU R21
B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10212EC214 and Fundamentals of machine learning

Course Coordinator : Dr T Kanimozhi

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Midterm Test I	CGPA
		Course Handling Faculty : Dr B.Venkataramanaiah		
1	VTU19617	VISWASAM LALITHA SRI HARSHINI	20	8.8

Training / Activities Conducted for fast learners

Company technical questions are solved

More Machine learning videos are shown

Criteria for fast learners: M1 greater than 16 and CGPA greater than 8.5

Improvement/ Achievement of fast learners

The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions

Faculty Signature **CC Signature** **HOD Signature**

what are the key features of python?

- Easy-to-read syntax
- Dynamically typed
- High-level data structures
- Interpreted language

2. what is the purpose of the `__int__` method in python classes?

- Constructor in python classes
- It is automatically called when an object of the class is created.

3 Explain the concept of duck typing in python?

- Is a dynamic type concept in python where the class of an object is determined by it's behaviour rather than by it's explicit declaration.

4. what are the main advantages of using python?

- python is more accessible and easier to learn for new developers.
- It also have a much higher readability than other coding languages like Java or c++

5. How do you identify bugs in your code?

- As a developer, identifying and fixing bugs on a timely basis. I use pychecker to search for bugs in the source code

what is an Interpreted language ?

- Interpreted language executes its statements line by line.
- Languages such as Python, Javascript, Ruby are prime examples.
- Runs directly from source code, with no intermediary compilation step.

7. what is PEP s and why it is important ?

- PEP stands for Python Enhancement proposal.
- PEP s is especially important since it documents the style guidelines for Python code.

8. what is docstring in Python ?

- Documentation string or docstring is a multiline string used to document a specific code segment.

9. what is lambda function ?

- A lambda function is an anonymous function. This function can have any no. of parameters but, can have just one statement.

10. what is break statement in Python ?

- It is used to terminate the loop in which it is present. After that, the control will pass to the statements that are present after break statement.

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DEPARTMENT OF ECE
VTR UGE 2021 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10212EC101/RF and Microwave Integrated Circuits

Course Coordinator : Dr.Beulah Jackson

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		Course Handling Faculty: Dr.T.Kavitha		
1	VTU18957	BALIREDDY DEYDEEPYA	8.4	24
2	VTU19197	LINGAMGUNTA DIVYAJNA	8.5	28
3	VTU19066	POLAGANI LOKESH	8.5	27.5
4	VTU21310	NADIGANTI LAKSHMI PRASANNA	8.6	29.5

Training / Activities Conducted for fast learners

- Encouraged students to take up competitive exams like GATE, GRE, TOEFL, IELTS, CAT, PGCET etc
- Also provided opportunities to develop their creativity by participating and organizing intercollegiate as well as ***national level technical symposiums***
- Placement oriented activities – Technical round HR questions discussed
- Advised them to participate in national level conference

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

Few students got benefitted from the discussion and they are preparing journal papers
Students interested for internship in national and international levels

Faculty Signature **CC Signature** **HOD Signature**

GATE QUESTIONS

If a right-handed circularly polarized wave is incident normally on a plane perfect conductor, then the reflected wave will be

(A) right-handed circularly polarized

(B) left-handed circularly polarized

(C) elliptically polarized with a tilt angle of 450

(D) horizontally polarized

The electric field of a uniform plane electromagnetic wave is

$$\vec{E} = \left(\overrightarrow{a_x} + j4\overrightarrow{a_y}\right) \exp\left[j\left(2\pi \times 10^7 t - 0.2z\right)\right]$$

The polarization of the wave is

(A) right handed circular

(B) right handed elliptical

(C) left handed circular

(D) left handed elliptical

The electric field of a uniform plane electromagnetic wave is

$$\vec{E} = \left(\vec{a_x} + j4\vec{a_y}\right) \exp\left[j\left(2\pi \times 10^7 t - 0.2z\right)\right]$$

The polarization of the wave is

A right handed circular

B right handed elliptical

C left handed circular

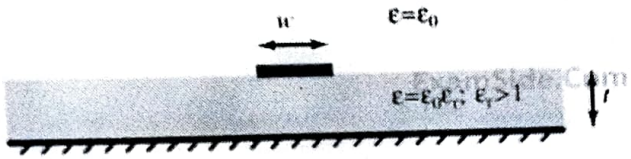
D left handed elliptical

A two wire transmission line terminates in a television set. The VSWR measured on the line is 5.8. The percentage of power that is reflected from the television set is

Answer

Correct Answer is **49.8**

A lossless microstrip transmission line consists of a trace of width w. It is drawn over a practically infinite ground plane and is separated by a dielectric slab of thickness t and relative permittivity $\varepsilon_r > 1$. The inductance per unit length and the characteristic impedance of this line are L and Z_o respectively.



Which one of the following inequalities is always satisfied?

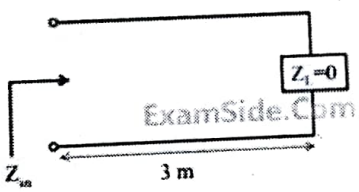
(A) $Z_o > \sqrt{\frac{Lt}{\epsilon_o \varepsilon_r w}}$

(B) $Z_o < \sqrt{\frac{Lt}{\epsilon_o \varepsilon_r w}}$

(C) $Z_o > \sqrt{\frac{Lw}{\epsilon_o \varepsilon_r t}}$

(D) $Z_o < \sqrt{\frac{Lw}{\epsilon_o \varepsilon_r t}}$

Consider the 3 m long lossless air-filled transmission line shown in the figure. It has a characteristic impedance of $120\pi\,\Omega$, is terminated by a short circuit, and is excited with a frequency of 37.5 MHz. What is the nature of the input impedance (Z_{in})?



(A) Open

(B) Short

(C) Inductive

(D) Capacitive

The modes in a rectangular waveguide are denoted by TE_{mn}/TM_{mn} where m and n are the eigen numbers along the larger and smaller dimensions of the waveguide respectively. Which one of the following satements is TRUE?

A The TM_{10} mode of the waveguide does not exist

B The TE_{10} mode of the waveguide does not exist

C The TM_{10} and the TE_{10} modes both exist and have the same cut-off frequencies

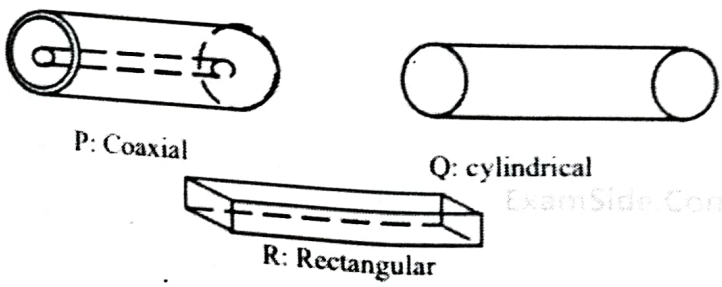
D The TM_{10} and the TM_{01} modes both exist and have the same cut-off frequencies.

Consider an air filled rectangular waveguide with a cross-section of $5\ cm \times 3\ cm$. For this waveguide, the cut-off frequency (in MHz) of TE_{21} mode is _____

Answer

Correct Answer is **11.7**

Which of the following statements is true regarding the fundamental mode of the metallic waveguides shown?



ExamSide.Com

A Only P has no cutoff- frequency

B Only Q has no cutoff-frequency

C Only R has no cutoff-frequency

D All three have cutoff-frequencies

Consider an air-filled rectangular waveguide with dimensions a = 2.286cm and b = 1.016cm. At 10GHz operating frequency, the value of the propagation constant (per meter) of the corresponding propagation mode is _____

Answer

Correct Answer is **158**

Consider an air-filled rectangular waveguide with dimensions a = 2.286 cm and b = 1.016 cm. The increasing order of the cut-off frequencies for different modes is

A $TE_{01} < TE_{10} < TE_{11} < TE_{20}$

B $TE_{20} < TE_{11} < TE_{10} < TE_{01}$

C $TE_{10} < TE_{20} < TE_{01} < TE_{11}$

D $TE_{10} < TE_{11} < TE_{20} < TE_{01}$

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 10211EC109 Embedded System Design

Course Coordinator : Dr G Sasikala

Course Handling Faculty : Dr R Sathesh Raaj **Section : A**

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
1	VTU19420	GALI VENKATA PAVAN KALYAN REDDY	8.5	27
2	VTU20617	GOGULA VENU GOPAL	8.6	27

Criteria for fast learners: CGPA greater than 8.5 and Test 1 greater than 25

Training / Activities Conducted for fast learners

- Motivated to prepare Embedded system Applications
- Motivated to design project based on the embedded systems

Improvement/ Achievement of fast learners

- The knowledge gained in the course will help the students in preparing for competitive exams and participating in competitions.

R. Sathesh Raaj
Faculty Signature

CC Signature

HOD Signature

16

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE - 2021 B. TECH – ECE
SUMMER 2023-2024
PROJECT ASSIGNMENT FOR FAST LEARNERS

Course Handling Faculty: **Dr. R. Sathesh Raaj**
Course Code & Title: **10211EC109 / Embedded System Design**
Course Category: **Programme Elective**

TTS No: **3651**
Sec: **A**
Date : 13.09.23

Q1. Design Arduino Based Real-Time Digital Clock with Temperature Display

R. Sathesh Raj
Faculty

Course Coordinator

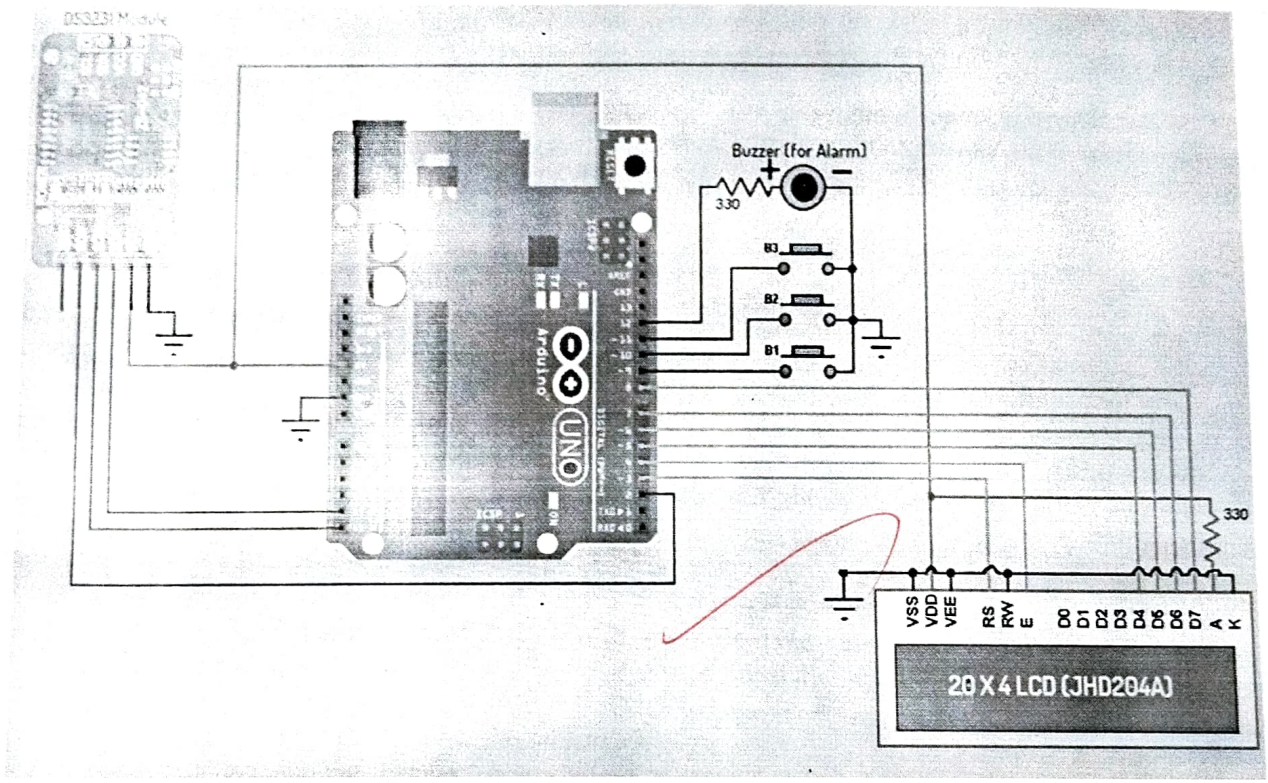
HOD-ECE

Project Assignment

Work done by:

Arduino Based Real-Time Digital Clock with Temperature Display

DESIGN CONNECTION :



CODE :

```
// include LCD library code
#include <LiquidCrystal.h>
// include Wire library code (needed for I2C protocol devices)
#include <Wire.h>

// LCD module connections (RS, E, D4, D5, D6, D7)
LiquidCrystal lcd(3, 4, 5, 6, 7, 8);

const int button1  = 9;          // button1 pin number
const int button2  = 10;         // button1 pin number
const int button3  = 11;         // button1 pin number
const int alarm_pin = 12;        // Alarms pin number

void setup() {
 pinMode(9, INPUT_PULLUP);
 pinMode(10, INPUT_PULLUP);
 pinMode(11, INPUT_PULLUP);
```

```
 pinMode(12, OUTPUT);
 digitalWrite(alarm_pin, LOW);
 // set up the LCD's number of columns and rows
 lcd.begin(20, 4);
 Wire.begin();                    // Join I2C bus
 attachInterrupt(digitalPinToInterrupt(2), Alarm, FALLING);
}

// Variables declaration
bool alarm1_status, alarm2_status;
char Time[]     = "  :  :  ",
   calendar[] = "     /  /20  ",
   alarm1[]   = "A1:  :  :00", alarm2[]   = "A2:  :  :00",
   temperature[] = "T:   .  C";
byte  i, second, minute, hour, day, date, month, year,
    alarm1_minute, alarm1_hour, alarm2_minute, alarm2_hour,
    status_reg;

void Alarm(){
 digitalWrite(alarm_pin, HIGH);
}
void DS3231_read(){                    // Function to read time & calendar data
 Wire.beginTransmission(0x68);               // Start I2C protocol with DS3231 address
 Wire.write(0);                         // Send register address
 Wire.endTransmission(false);                // I2C restart
 Wire.requestFrom(0x68, 7);                  // Request 7 bytes from DS3231 and release I2C bus at end of reading
 second = Wire.read();                  // Read seconds from register 0
 minute = Wire.read();                  // Read minuts from register 1
 hour   = Wire.read();                  // Read hour from register 2
 day    = Wire.read();                  // Read day from register 3
 date   = Wire.read();                  // Read date from register 4
 month  = Wire.read();                  // Read month from register 5
 year   = Wire.read();                  // Read year from register 6
}
 void alarms_read_display(){            // Function to read and display alarm1, alarm2 and temperature data
  byte control_reg, temperature_lsb;
  char temperature_msb;
  Wire.beginTransmission(0x68);             // Start I2C protocol with DS3231 address
  Wire.write(0x08);                     // Send register address
  Wire.endTransmission(false);              // I2C restart
  Wire.requestFrom(0x68, 11);               // Request 11 bytes from DS3231 and release I2C bus at end of reading
  alarm1_minute = Wire.read();              // Read alarm1 minutes
  alarm1_hour   = Wire.read();              // Read alarm1 hours
  Wire.read();                          // Skip alarm1 day/date register
  alarm2_minute = Wire.read();              // Read alarm2 minutes
  alarm2_hour   = Wire.read();              // Read alarm2 hours
  Wire.read();                          // Skip alarm2 day/date register
  control_reg = Wire.read();                // Read the DS3231 control register
  status_reg  = Wire.read();                // Read the DS3231 status register
  Wire.read();                          // Skip aging offset register
  temperature_msb = Wire.read();            // Read temperature MSB
  temperature_lsb = Wire.read();            // Read temperature LSB
   // Convert BCD to decimal
  alarm1_minute = (alarm1_minute >> 4) * 10 + (alarm1_minute & 0x0F);
  alarm1_hour   = (alarm1_hour  >> 4) * 10 + (alarm1_hour & 0x0F);
```

```
  arm2_minute = (alarm2_minute >> 4) * 10 + (alarm2_minute & 0x0F);
  arm2_hour   = (alarm2_hour  >> 4) * 10 + (alarm2_hour & 0x0F);
  // End conversion
 alarm1[8]    = alarm1_minute % 10  + 48;
 alarm1[7]    = alarm1_minute / 10  + 48;
 alarm1[5]    = alarm1_hour  % 10  + 48;
 alarm1[4]    = alarm1_hour  / 10  + 48;
 alarm2[8]    = alarm2_minute % 10  + 48;
 alarm2[7]    = alarm2_minute / 10  + 48;
 alarm2[5]    = alarm2_hour  % 10  + 48;
 alarm2[4]    = alarm2_hour  / 10  + 48;
 alarm1_status = bitRead(control_reg, 0);    // Read alarm1 interrupt enable bit (A1IE) from DS3231 control register
 alarm2_status = bitRead(control_reg, 1);    // Read alarm2 interrupt enable bit (A2IE) from DS3231 control register
 if(temperature_msb < 0){
  temperature_msb = abs(temperature_msb);
  temperature[2] = '-';
 }
 else
  temperature[2] = ' ';
 temperature_lsb >>= 6;
 temperature[4] = temperature_msb % 10  + 48;
 temperature[3] = temperature_msb / 10  + 48;
 if(temperature_lsb == 0 || temperature_lsb == 2){
   temperature[7] = '0';
   if(temperature_lsb == 0) temperature[6] = '0';
   else                     temperature[6] = '5';
 }
 if(temperature_lsb == 1 || temperature_lsb == 3){
   temperature[7] = '5';
   if(temperature_lsb == 1) temperature[6] = '2';
   else                     temperature[6] = '7';
 }
 temperature[8]  = 223;                  // Put the degree symbol
 lcd.setCursor(10, 0);
 lcd.print(temperature);                 // Display temperature
 lcd.setCursor(0, 2);
 lcd.print(alarm1);                      // Display alarm1
 lcd.setCursor(17, 2);
 if(alarm1_status)  lcd.print("ON ");     // If A1IE = 1 print 'ON'
 else               lcd.print("OFF");    // If A1IE = 0 print 'OFF'
 lcd.setCursor(0, 3);
 lcd.print(alarm2);                      // Display alarm2
 lcd.setCursor(17, 3);
 if(alarm2_status)  lcd.print("ON ");     // If A2IE = 1 print 'ON'
 else               lcd.print("OFF");    // If A2IE = 0 print 'OFF'
}
void calendar_display(){                 // Function to display calendar
 switch(day){
   case 1: strcpy(calendar, "Sun  / /20 "); break;
   case 2: strcpy(calendar, "Mon  / /20 "); break;
   case 3: strcpy(calendar, "Tue  / /20 "); break;
   case 4: strcpy(calendar, "Wed  / /20 "); break;
   case 5: strcpy(calendar, "Thu  / /20 "); break;
   case 6: strcpy(calendar, "Fri  / /20 "); break;
   case 7: strcpy(calendar, "Sat  / /20 "); break;
```

```
  default: strcpy(calendar, "Sat   /  /20  ");
 }
 calendar[13] = year  % 10 + 48;
 calendar[12] = year  / 10 + 48;
 calendar[8]  = month % 10 + 48;
 calendar[7]  = month / 10 + 48;
 calendar[5]  = date  % 10 + 48;
 calendar[4]  = date  / 10 + 48;
 lcd.setCursor(0, 1);
 lcd.print(calendar);                    // Display calendar
}
void DS3231_display(){
 // Convert BCD to decimal
 second = (second >> 4) * 10 + (second & 0x0F);
 minute = (minute >> 4) * 10 + (minute & 0x0F);
 hour = (hour >> 4) * 10 + (hour & 0x0F);
 date = (date >> 4) * 10 + (date & 0x0F);
 month = (month >> 4) * 10 + (month & 0x0F);
 year = (year >> 4) * 10 + (year & 0x0F);
 // End conversion
 Time[7] = second % 10  + 48;
 Time[6] = second / 10  + 48;
 Time[4] = minute % 10  + 48;
 Time[3] = minute / 10  + 48;
 Time[1] = hour  % 10  + 48;
 Time[0] = hour  / 10  + 48;
 calendar_display();                     // Call calendar display function
 lcd.setCursor(0, 0);
 lcd.print(Time);                        // Display time
}
void Blink(){
 byte j = 0;
 while(j < 10 && (digitalRead(button1) || i >= 5) && digitalRead(button2) && (digitalRead(button3) || i < 5)){
  j++;
  delay(25);
 }
}
```

15/9/23

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 1152EC120/ Satellite Communication

Course Coordinator : Dr. R.Sreelakshmy

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	UT I
Section : H		**Course Handling Faculty : Dr.B.Ashvanth**		
1	VTU15360	KOTA SIVA TEJASEWINI	8.91	10
2	VTU17076	M ABHI VARSHA	8.85	8
3	VTU17619	UDAYAGIRI SURENDRA BABU	8.74	10

Training / Activities Conducted for fast learners

1. Simple project is taught using MatLab.
2. Motivated to prepare for Gate exam also shared Gate questions in Communication Systems

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 8

Improvement/ Achievement of fast learners

-

- Performances of the students were good.

Faculty Signature

CC Signature

HOD Signature

Vel Tech
Rangarajan Dr. Sagunthala

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH – ECE
WINTER 2022-2023

FAST LEARNERS LIST

Course Code and Title : 1152EC120 – SATELLITE COMMUNICATION

Course Coordinator : Dr. SREELAKSHMY R

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : B		**Course Handling Faculty : Dr.SREELAKSHMY.R**		
		NIL		

Training / Activities Conducted for fast learners

Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

NIL.

Faculty Signature **CC Signature** **HOD Signature**

VTU 15360
K. Tyagaraman

A Uplink Budget:

1. Earth station (ES) Effective Isotropic Radiated power (EIRP):

EIRP = Earth station Transmit power + + Earth station Transmit Antenna Gain - Earth Station Backoff Loss - Earth station Feeder Loss

EIRP = 05 (last two digits of your VTU 18105) + 10 - 3 + 4 = 8 dBW

2. Uplink signal strength at satellite

Uplink signal strength at satellite:

Uplink signal strength at satellite = EIRP - Atmospheric Loss - Free space path Loss

Uplink signal strength at satellite =

8 - 200 = - 198 dBW

3. Satellite Uplink G/T (Gain-to-Noise of Temperature) Ratio:

Satellite Uplink G/T = Receiver G/T at Satellite = Received G/T = -5 dB/K (You should convert dB/K to dBW/K for consistency) and assuming a standard noise temperature of 290 K for the receiver:

Satellite Uplink G/T = -5 log10(290) = -33 dBW/K

4. Uplink C/N (Carrier-to-Noise Ratio) Ratio:

Uplink C/N = Uplink signal strength at Satellite - Satellite Uplink G/T

Uplink C/N = -198 - (-33) = -165 dB

Downlink Budget:

1. Satellite Effective Isotropic Radiated Power (EIRP):

EIRP = Satellite Transmit Power

+ Satellite Transmit Antenna Gain.
- Satellite Backoff Loss - satellite Feeder Loss
EIRP = 18 (first two digits of your VTU id
+ 30 - 1 - 2 = 45 dBW

2. Downlink signal strength at Earth sation =
EIRP - Downlink Atmospheric Loss - Free Space
path Loss
Downlink signal strength at Earth station
= 45 - 6 - 100 = -61 dBW

3. Receiver G/T at Earth station:
Given that Receiver G/T at Earth
station = 35 dB/k (You should convert dB/k
to dBW/k for consistency) and assuming a
standard noise temperature G/T at Earth
Station = 35 - 10* log 10 (290) = 1 dBW/k

4. Downlink C/N (carrier - to - Noise Ratio)
Ratio: Downlink C/N = Downlink signal strength at
Earth Satation - Receiver G/T at Earth station
Downlink C/N = -61 - 1 = -62 dB

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10212EC156&DATA ANALYSIS AND VISUALIZATION

Course Coordinator : Dr.Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : G		**Course Handling Faculty :** Dr. M.Anto Bennet		
1.	Nil	Nil	-	-

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 28

Faculty Signature **Course Coordinator** **HOD/ECE**

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DEPARTMENT OF ECE
VTR UGE 21B. TECH – ECE
SUMMER 2023 – 2024

List of Fast Learners – Action Taken Report

Course Code and Title : 10212EC156 – Data Analysis and Visualization
Course Coordinator : Dr. R Rajkumar

S. No	VTU No.	Name of the Student	Outcome
Section: C		**Course Handling faculty: Dr. R Rajkumar**	
1.	VTU20862	ADITYA SHARMA	• Students completed MATLAB Onramp. • Completed AICTE online Internship
2.	VTU21098	S V L SAI NEHA	

Faculty In-Charge

Course Coordinator

HOD / ECE

Sec A Fast learner

A.Lokesh
VTU 20903

SALARY PREDICTION

```
[illegible]
[illegible]
[illegible]
[illegible]

df= [illegible]('Train_salary.csv')

df
```

	Name	JobTitle	AgencyID	Agency	HireDate	AnnualSala
0	Aaron,Keontae E	AIDE BLUE CHIP	W02200	Youth Summer	06/10/2013	$11310.
1	Aaron,Patricia G	Facilities/Office Services II	A03031	OED-Employment Dev	10/24/1979	$53428.
2	Aaron,Petra L	ASSISTANT STATE'S ATTORNEY	A29005	States Attorneys Office	09/25/2006	$68300.
3	Abaineh,Yohannes T	EPIDEMIOLOGIST	A65026	HLTH-Health Department	07/23/2009	$62000.
4	Abbene,Anthony M	POLICE OFFICER TRAINEE	A99416	Police Department	07/24/2013	$43999.
...	...	...	...	...	...	
18976	Zotamou,Jean Marie D	AIDE BLUE CHIP	W02235	Youth Summer	05/21/2014	$11310.

```
df.isnull().sum()
```

```
Name            0
JobTitle        0
AgencyID        0
Agency          0
HireDate       70
AnnualSalary    0
GrossPay     3223
dtype: int64
```

```
salary_cpy = df.copy()

salary_cpy.columns
```

```
Index(['Name', 'JobTitle', 'AgencyID', 'Agency', 'HireDate', 'AnnualSalary',
       'GrossPay'],
      dtype='object')
```

```
salary_cpy = salary_cpy.drop('GrossPay',axis=1)

salary_cpy = salary_cpy.dropna(subset=['HireDate'])

salary_cpy['AnnualSalary'] = salary_cpy['AnnualSalary'].apply(lambda x : float(str(x)[1:]))

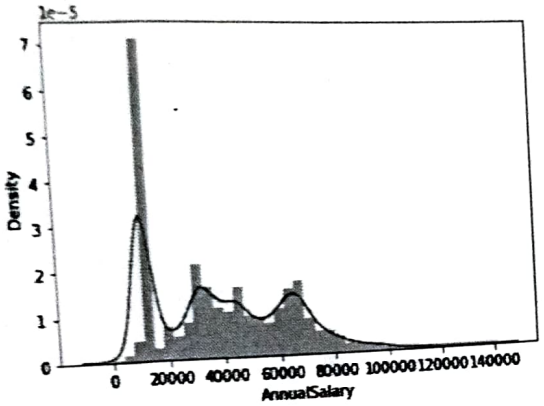
salary_cpy['month'] = salary_cpy['HireDate'].apply(lambda x : int(str(x[0:2])))
salary_cpy['day'] = salary_cpy['HireDate'].apply(lambda x : int(str(x[3:5])))
salary_cpy['year'] = salary_cpy['HireDate'].apply(lambda x : int(str(x[6:])))

salary_cpy=salary_cpy.drop("HireDate",axis=1)

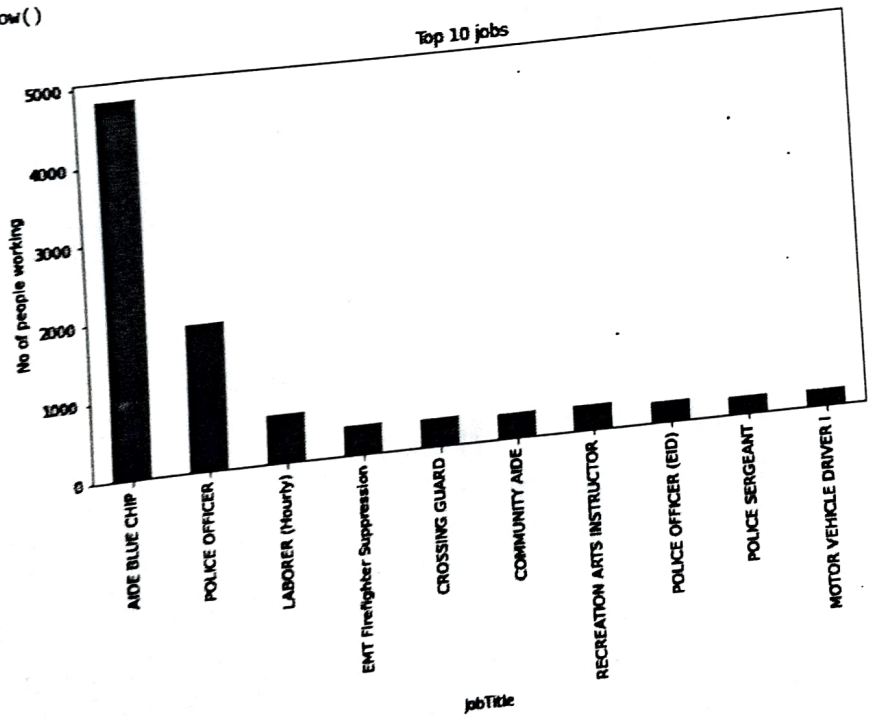
salary_cpy.AnnualSalary.plot.box()
```

```
sns.distplot(salary_cpy.AnnualSalary)
```

```
C:\Users\khush\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarni
  warnings.warn(msg, FutureWarning)
<AxesSubplot:xlabel='AnnualSalary', ylabel='Density'>
```




```
plt.figure(figsize=(10,5))
salary_cpy.groupby(['JobTitle'])['JobTitle'].count().sort_values(ascending=False).head(10).plot.bar()
plt.ylabel('No of people working')
plt.title('Top 10 jobs')
plt.show()
```

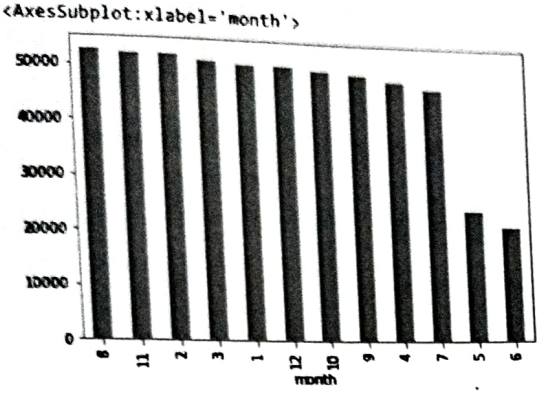



```
plt.figure(figsize=(10,5))
salary_cpy.groupby(['JobTitle'])['AnnualSalary'].mean().sort_values(ascending=False).head(10).plot.bar()
plt.ylabel('salary')
plt.title('Top 10 jobs')
plt.show()
```

```
C:\Users\khush\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning:
```

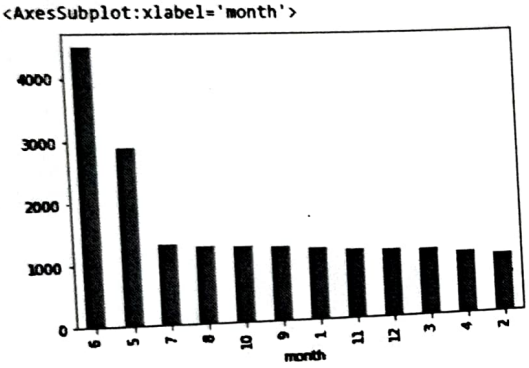
```
salary_cpy.groupby('month')['AnnualSalary'].mean().sort_values(ascending=False).plot.bar()
```

```
<AxesSubplot:xlabel='month'>
```



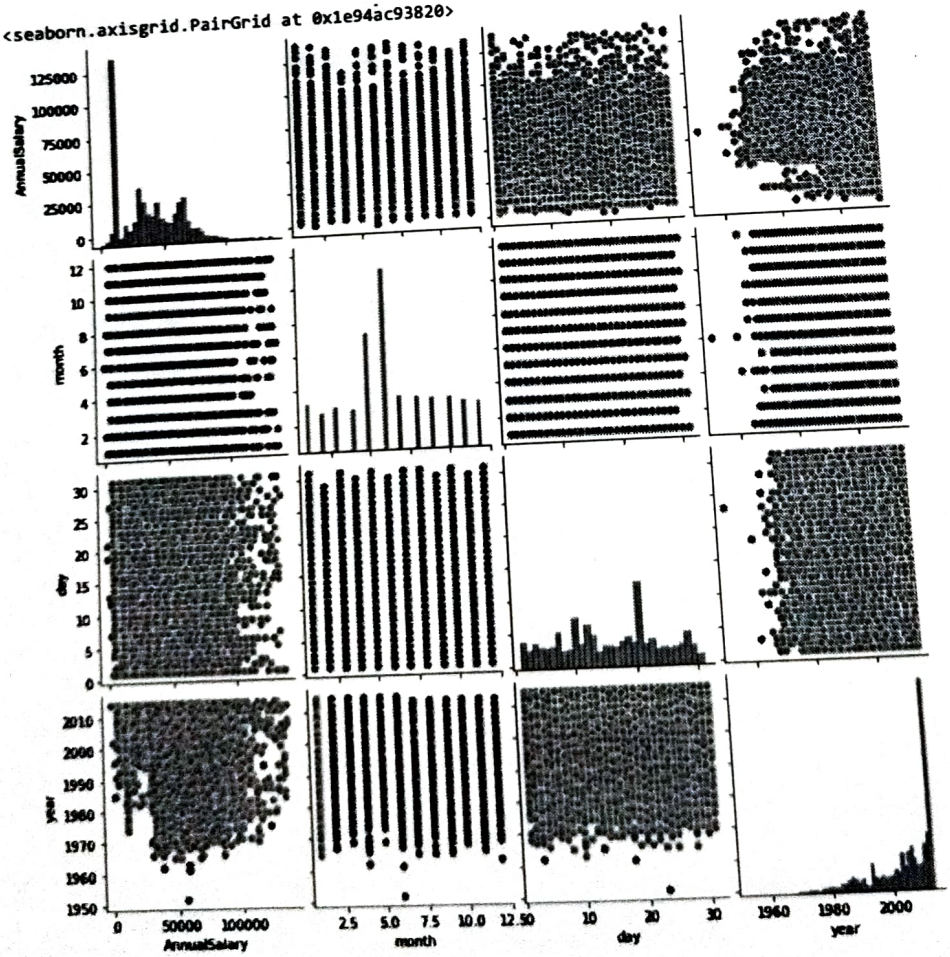

```
salary_cpy.groupby('month')['Name'].count().sort_values(ascending=False).plot.bar()
```

```
<AxesSubplot:xlabel='month'>
```




```
sns.pairplot(salary_cpy)
```

```
<seaborn.axisgrid.PairGrid at 0x1e94ac93820>
```



	JobTitle	AgencyID	Agency	AnnualSalary	month	day	year
0	11313.967200	11310.000000	11310.270645	11310.0	6	10	2013
1	47443.500000	46667.000000	51495.424242	53428.0	10	24	1979
2	69750.666667	65926.133333	64874.560224	68300.0	9	25	2006
3	57940.000000	48071.851064	39980.900360	62000.0	7	23	2009
4	44531.160494	44012.307229	61481.005417	43999.0	7	24	2013
...	...	...	...	...	...	...	...
18976	11313.967200	11310.000000	11310.270645	11310.0	5	21	2014
18977	11313.967200	11310.000000	11346.315789	11310.0	5	21	2014
18978	44531.160494	44012.307229	61481.005417	43999.0	12	17	2013
18979	60588.139335	60203.340426	61481.005417	44104.0	1	23	2013

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression

train,test = train_test_split(salary_cpy,test_size=0.2,random_state=40)

y_train = train.pop('AnnualSalary')
x_train = train

y_test = test.pop('AnnualSalary')
x_test = test

x_train
```

	JobTitle	AgencyID	Agency	month	day	year
7642	43420.383333	58304.555556	70879.869663	10	29	1973
4899	37750.307692	57531.300000	42565.513078	2	11	2008
6525	11313.967200	11310.000000	11310.270645	6	19	2013
10668	21570.423841	53425.912281	44092.921659	6	4	2014
8828	28019.000000	57318.900000	61481.005417	1	23	2014
...	...	...	...	...	...	...
11615	61887.457627	54165.304348	44092.921659	2	13	2012
16156	41202.000000	44320.250000	39950.622030	6	9	2014
14589	11313.967200	11310.000000	11310.270645	6	12	2012
14643	60588.139335	57363.487805	61481.005417	9	26	2011
11673	78020.054054	65134.750000	61481.005417	5	22	1981

15108 rows × 6 columns

```
y_train
```

```
7642     67288.0
4899     36887.0
6525     11310.0
10668    29494.0
8828     27808.0
          ...
11615    49668.0
16156    41202.0
14589    11310.0
14643    44773.0
11673    82704.0
Name: AnnualSalary, Length: 15108, dtype: float64
```

```
from sklearn.preprocessing import StandardScaler

scaler = StandardScaler()
x_train[x_train.columns] = scaler.fit_transform(x_train[x_train.columns] )
```

	JobTitle	AgencyID	Agency	month	day	year
7642	0.165190	0.850517	1.502119	1.234739	1.571928	-2.995648
4899	-0.068712	0.815681	0.151586	-1.483279	-0.571617	0.375314
6525	-1.159263	-1.266644	-1.339221	-0.124270	0.381070	0.856880
10668	-0.736164	0.630729	0.224440	-0.124270	-1.405217	0.953194
8828	-0.470147	0.806112	1.053814	-1.823031	0.857413	0.953194
...	...	...	...	...	...	...
11615	0.926993	0.664039	0.224440	-1.483279	-0.333445	0.760567
16156	0.073677	0.220508	0.026861	-0.124270	-0.809788	0.953194
14589	-1.159263	-1.266644	-1.339221	-0.124270	-0.452531	0.760567
14643	0.873394	0.808121	1.053814	0.894987	1.214670	0.664254
11673	1.592494	1.158226	1.053814	-0.464022	0.738327	-2.225142

```
x_test[x_test.columns] = scaler.fit_transform(x_test[x_test.columns] )

lr = LinearRegression()

reg = lr.fit(x_train,y_train)

y_pred = reg.predict(x_test)

y_test
```

```
8116     30014.0
12921    11310.0
4004     60004.0
10824    44190.0
9512     71600.0
          ...
16417    96500.0
8485     55100.0
3085     82592.0
11816    37339.0
18493    78897.0
Name: AnnualSalary, Length: 3777, dtype: float64
```

```
y_pred
```

```
array([29234.16338847, 10605.9975065 , 59117.5420147 , ...,
       82249.90330949, 39601.20928108, 76473.11188939])
```

```
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

```
0.9639076918145556
```

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B.TECH – ECE
SUMMER 2023-2024

List of Fast Learners – Action Planned Report

Course Code and Title : 10212EC156 / DATA ANALYSIS AND VISUALIZATION
Course Coordinator : Dr. R Rajkumar

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Category	Test I
Section : E		Course Handling Faculty : Dr C Raja		
1.	VTU20369	PADIGAPATI VANDANA	A	25

Training / Activities Conducted for fast learners:

Given task to student(s) to do project presentation, related to data visualization, etc.,

Action Planned:

Reviewed the performance of project-based learning

Faculty
(Dr.C.RAJA)

Course Coordinator

HOD Sign

21)

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SCHOOL OF ELECTRICAL AND COMMUNICATION

DEPARTMENT OF ECE

VTU R21 B.TECH – ECE

SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title :10212EC228 –DATASCIENCE AND VISUALIZATION

Category: Specialization Elective

Course Coordinator : Dr.M.Anto Bennet

S.No	VTU No.	Name of the Student	Performance in MT- 1 CIA	Category
Slot: S2		Course Handling Faculty :Dr.R.Srinath		
1.	VTU20785	DUGGINENI LAKSHMI HARIKA	17	A

Training / Activities Conducted for fast learners

1. Encouraged the Students to take up daily test and task in Hacker rank portal
2. Advised the students to register and learn professional coding in Upgrade, Great learning etc., Portal
3. Giving daily task to fast learners.

Criteria for fast learners: MT1 greater than 16 with CGPA of 8.5

Improvement/ Achievement of fast learners

1. In depth learning of concept helps them to get placed in Top level MNC's during the time of Placement.
2. They can start their own project work in their academics

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10212EC228 & DATA SCIENCE AND VISUALIZATION

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : A		**Course Handling Faculty :** Dr. Ajisha M		
1.	VTU18996	GUDA VENKATA SUPRAJA	8.6	20
2.	VTU20769	HARSHANNJALI KANNE	8.7	19
3.	VTU24010	KATAMREDDY POOJITHA REDDY	9.1	20

Criteria for fast learners:CGPA greater than 8.5 and T1 greater than 17.5

Faculty Signature **Course Coordinator** **HOD/ ECE**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 2021 B.TECH – ECE
SUMMER 2023-2024

List of Fast Learners– Action Taken Report

Course Code and Title : 10212EC228 & DATA SCIENCE AND VISUALIZATION

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			Mid Test II	End Semester Result
Section : A		**Course Handling Faculty :** Dr. Ajisha M		
1	VTU18996	GUDA VENKATA SUPRAJA	20	A
3	VTU20769	HARSHANNJALI KANNE	20	A
4	VTU24010	KATAMREDDY POOJITHA REDDY	20	S

Action Taken:

1. Gate Questions and materials were shared
2. Discussed about how to present each and every question in the CIA tests and university exam.

Faculty Signature

Course Coordinator

HOD/ECE

21)

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE 21 B. TECH – ECE
SUMMER 2023 – 2024
List of Fast Learners – Report

Course Code and Title : 10212EC228 & DATA SCIENCE AND VISUALIZATION

Course Coordinator : Dr. M. Anto Bennet

S.No	VTU No.	Name of the Student	Performance of the Student	
			Category	CGPA
Slot:S4		**Course Handling Faculty :** Dr. Mariya Celin TA		
1.	VTU21287	T. SRI SAI LAKSHMI REVATHI	A	9.1
2.	VTU20908	B. Saketh Reddy	A	9.0

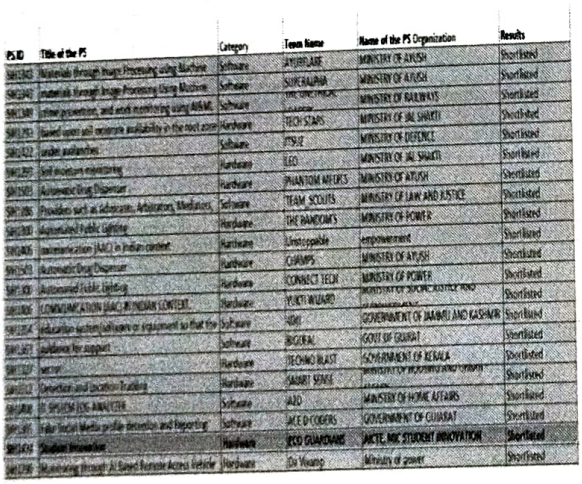
Training / Activities Conducted for fast learners

- Advised the students to participate in workshop/project presentation/paper presentation/Seminar presentation/ technical events like Smart India Hackathon (SIH) for better understanding of the recent technological upgrades.

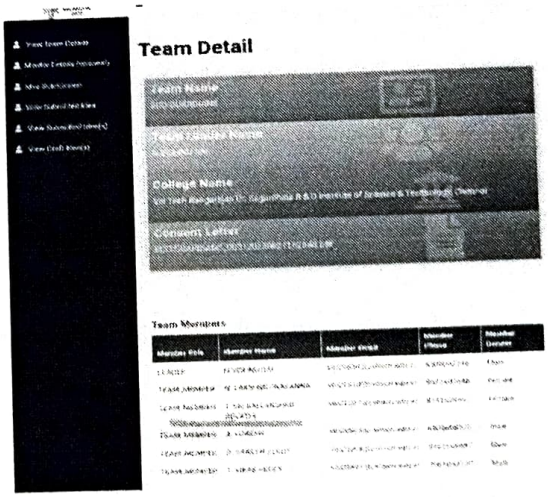
Improvement/ Achievement of fast learners

- Performance of the students in CIA Test was Improved.
- The students felt motivated by the seminars. Many other than fast learners also participated in SIH.

Proof of the student short-listed in SIH



PS ID	Title of the PS	Category	Team Name	Name of the PS Organization	Results
[illegible]	Materials through Image Processing using Machine	Software	AYURFLARE	MINISTRY OF AYUSH	Shortlisted
[illegible]	materials through Image Processing using Machine	Software	SUPERALPHA	MINISTRY OF AYUSH	Shortlisted
[illegible]	crime prevention, and work monitoring using AI&ML	Software	[illegible]	MINISTRY OF RAILWAYS	Shortlisted
[illegible]	based upon soil moisture availability in the root zone	Hardware	TECH STARS	MINISTRY OF JAL SHAKTI	Shortlisted
[illegible]	under avalanches	Software	ITSUE	MINISTRY OF DEFENCE	Shortlisted
[illegible]	Soil moisture monitoring	Hardware	LEO	MINISTRY OF JAL SHAKTI	Shortlisted
[illegible]	Automatic Drug Dispenser	Hardware	PHANTOM MEDICS	MINISTRY OF AYUSH	Shortlisted
[illegible]	Providers such as Advocates, Arbitrators, Mediators,	Software	TEAM SCOUTS	MINISTRY OF LAW AND JUSTICE	Shortlisted
[illegible]	Automated Public Lighting	Hardware	THE RANDOMS	MINISTRY OF POWER	Shortlisted
[illegible]	automarization (AAC) in Indian context	Hardware	Unstoppable	empowerment	Shortlisted
[illegible]	Automatic Drug Dispenser	Hardware	CHAMPS	MINISTRY OF AYUSH	Shortlisted
[illegible]	Automated Public Lighting	Hardware	CONNECT TECH	MINISTRY OF POWER	Shortlisted
[illegible]	COMMUNICATION (AAC) IN INDIAN CONTEXT	Hardware	YUKTI WIZARD	MINISTRY OF SOCIAL JUSTICE AND [illegible]	Shortlisted
[illegible]	education system software or equipment so that the	Software	ADKI	GOVERNMENT OF JAMMU AND KASHMIR	Shortlisted
[illegible]	guidance for support	Software	BIGDEAL	GOVT OF GUJRAT	Shortlisted
[illegible]	sector	Hardware	TECHNO BLAST	GOVERNMENT OF KERALA	Shortlisted
[illegible]	Detection and Location Tracking	Hardware	SMART SENSE	MINISTRY OF HOUSING AND URBAN [illegible]	Shortlisted
[illegible]	IT SYSTEM FOR ANALYTER	Software	AZO	MINISTRY OF HOME AFFAIRS	Shortlisted
[illegible]	Fake Social Media profile detection and Reporting	Software	ACE D CODERS	GOVERNMENT OF GUJARAT	Shortlisted
[illegible]	Student Innovation	Hardware	ECO GUARDIANS	AICTE, NIC STUDENT INNOVATION	Shortlisted
[illegible]	Monitoring through AI Based Remote Access Vehicle	Hardware	Da Vinamp	Ministry of power	Shortlisted



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smartknower
STAY AHEAD OF THE CURVE

CERTIFICATE

OF COURSE COMPLETION

THIS CERTIFICATE IS PROUDLY PRESENTED TO

Balpunuri Saketh Reddy

has successfully completed Data Science
from the period of 1/1/2023 to 28/02/2023.
During his/her internship we found the student was dedicated and hard working.

27-03-2023
DATE

P. Naveen
ACADEMIC HEAD

Certificate ID : 3309211224

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IETE

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Certificate of Participation

This is to certify that Dr. / Mr. / Ms. B. SAKETH REDDY of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology has participated in One day Hands-on training on **"*Artificial Intelligence For Biomedical Applications*"** organized by the Department of Electronics and Communication Engineering in association with IETE Institute Students Forum held on **29.10.2022** .

Dr.E.D.Kanmani Ruby
IETE COORDINATOR

Dr P.Esther Rani
HOD-ECE

Dr. V. Jayasankar
DEAN-SOEC

Faculty In-charge

Course Coordinator

HOD / ECE

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTR UGE21 B. TECH – ECE
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10213EC104/ Wireless Communication Networks

Course Coordinator : Dr. Helina Rajni Suresh

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test II
Section : E		**Course Handling Faculty : Dr. Jency Rubia J**		
Nil				

Criteria for fast learners: CGPA greater than 8.4 and Test 2 greater than 24

Training / Activities Conducted for fast learners

Improvement/ Achievement of fast learners

Faculty Signature **CC Signature** **HOD Signature**

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SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF ECE
VTRUGE 2021 B.TECH
SUMMER 2023-2024

FAST LEARNERS LIST

Course Code and Title : 10213EC104 & Wireless Communication Networks

Course Coordinator : Dr.Helina Rajini Suresh

S.No	VTU No.	Name of the Student	Performance of the student in CIA	
			CGPA	Test I
Section : S1		**Course Handling Faculty :** Dr.Helina Rajini Suresh		
1.	VTU21500	SHAIK MAHAMMAD AFZAL	9	26
2.	VTU22082	PASUPULETI RAKESH	8.6	26
3.	VTU22153	R SUJANA SAI	9.2	27.5
4.	VTU22236	G SIDDARTHA	8.6	25.5
5.	VTU22872	VANTIGARI SUREKHA NAIDU	9.2	26.5
6.	VTU22931	A K BOOMIKA	9.1	24
7.	VTU23051	K SUDESHNA	8.5	26.5
8.	VTU23052	CHAPPIDI RAM LIKHITH REDDY	9.8	26.5
9.	VTU23152	GUNDAPU SAI CHANDANA	8.6	24
10.	VTU23177	PARCHURI TEJASRI	9.2	24.5
11.	VTU23902	B R CHETAN KUMAR	8.5	24.5

Training / Activities Conducted for fast learners

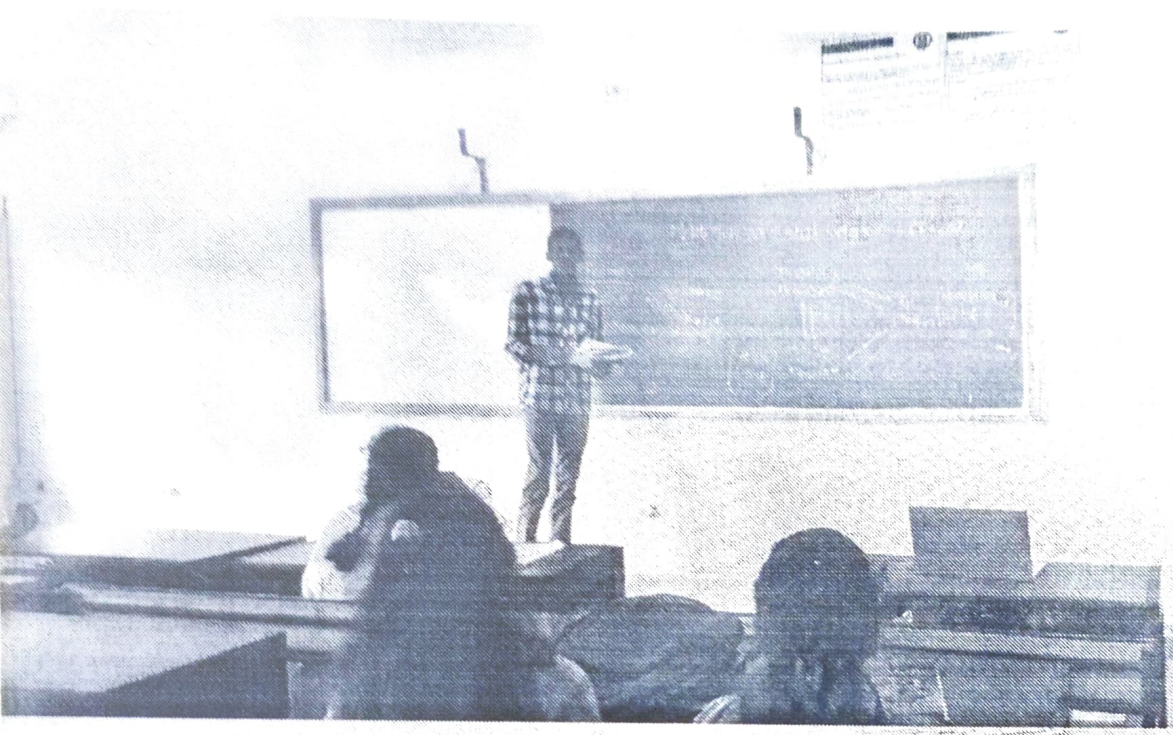
- Seminar given

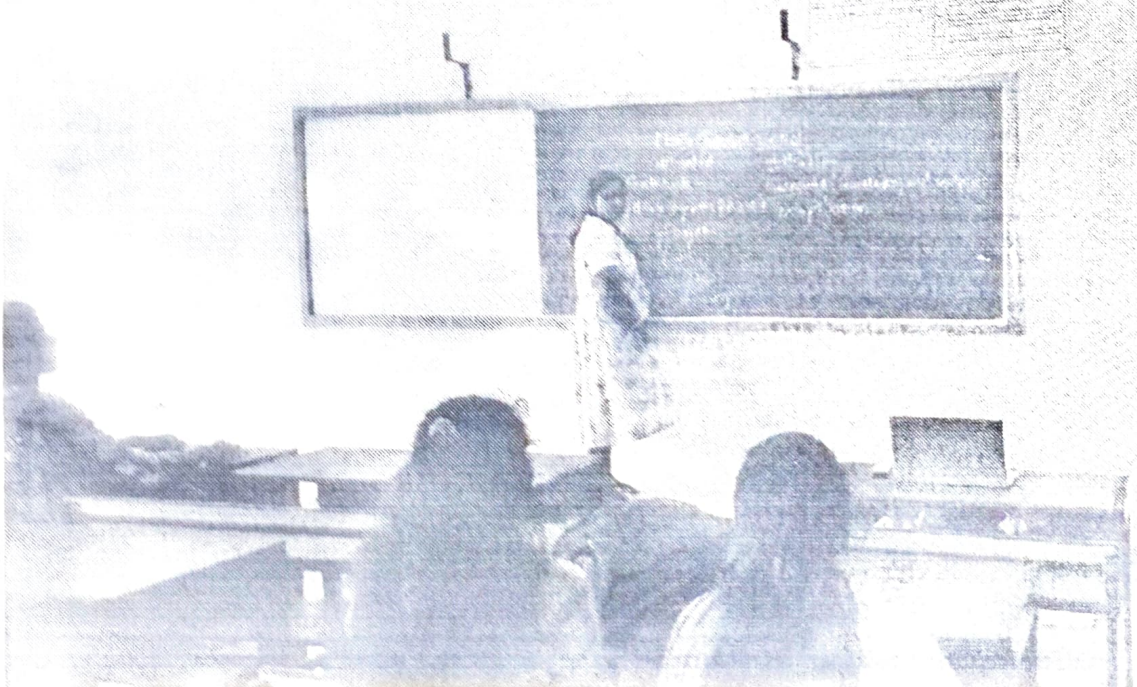
Criteria for fast learners: CGPA greater than 8.5 and T1 greater than 24

Improvement/ Achievement of fast learners

- Performance improved in Test II and Test III.

Faculty Signature **CC Signature** **HOD Signature**





CERTIFICATE

Of Participation

AWARDED TO

Shaik Mahammad Afzal

For attending the **Ethical Hacking Mega Workshop** hosted by **Mr Abhinav Devaguptapu, Cyber Security Specialist,** conducted exclusively for CCBP 4.0 Academy Students.

Issue Date:

4-Oct-2023



Rahul A

Rahul Attuluri

CEO, NxtWave™