MOU - 13(B)

Extension / Renewal of

Memorandum of Understanding (MoU)

between

VelTech Dr RR & Dr SR Technical University, Chennai

and

The Automotive Research Association of India, (ARAI), Pune

for

Original MoU dated 07-October-2011 for

Joint 2 Year Postgraduate M. Tech. Programme in I C Engine &

Joint 2 Year Postgraduate M Tech Programme in Electronics Engineering
(with specialization in Automotive Electronics)

ARAI®
Progress through Research

VEL TECH®
Dr.RR & Dr.SR
TECHNICAL UNIVERSITY
University u/s 3 of UGC Act, 1956
Avadi, Chennai
ACCREDITED BY NAAC WITH 'A' GRADE

on

March 18, 2016.

- Venue -

VelTech University, Chennai



महाराष्ट्र MAHARASHTRA ◐ 2015 ◐ W 643220

ज्या कारणासाठी त्यांनी मुद्रांक खरेदी केला आहे त्यांनी त्याच कारणासाठी तो खरेदी पासून ६ महिन्याच्या आत वापर करायचा आहे.

दस्तऐवजाचा/ अनुच्छेद क्रमांक :.....Agreement

दस्त नोंदणी करणार आहेत का :.....

नोंदणी होणार असल्यास दुय्यम निबंधक कार्यालयाचे नाव :.....

मोबदला रु.

मुद्रांक शुल्क रु.

दुसऱ्या पक्षकाराचे नाव

ARAI Pune-38

VTU

M. Tiwari

500/-

मुद्रांक शुल्क रु.

7191

09 MAR 2016

मुद्रांक विक्रेत्याची सही

परवानाधारक मुद्रांक विक्रेत्याची सही/पक्का/

परवाना क्रमांक

The Pune Lawyers Consumer's Co-op Society Ltd., Pune-5 LIC. No. 2201111

- 3 MAR 2016

Agreement on Renewal of
Memorandum of Understanding
between
VelTech Dr RR & Dr SR Technical University, Chennai
(deemed to be University u/s.3 of UGC Act, 1956)
and
The Automotive Research Association of India (ARAI), Pune

VELTECH Dr. RR & Dr. SR Technical University (hereinafter referred to as VELTECH) and the Automotive Research Association of India (ARAI), a Registered Society and an Industrial Research Organization formed by the Indian Automotive Industries and the Ministry of Heavy Industries and Public Enterprises, Government of India, located at Pune, (hereinafter referred to as ARAI), had earlier entered in to an

Agreement on Renewal of Memorandum of Understanding
between
VelTech Dr RR & Dr SR Technical University, Chennai, and
The Automotive Research Association of India (ARAI), Pune

agreement on 7th October 2011 for five batches to jointly offer a two-year M Tech Programme in I C Engines as well as M Tech Programme in Automotive Electronics & Embedded System.

The two parties note with satisfaction that M Tech programme in I C Engine has been very successful and 4 batches of students have completed their study and are gainfully employed. The 5th batch has finished its first year and entered into their second year in 2015-2016.

In case of M Tech programme in Automotive Electronics & Embedded Systems (AE&ES), four batches have completed their study and fifth batch has finished its first year and entered into its second year 2015-2016.

Veltech and ARAI, therefore agree to extend the validity of the Memorandum of Understanding signed on 7th October 2011 to run the said M Tech Programme in I C Engines jointly for another **four batches** commencing from Academic Year 2015-2016 and run M Tech programme in Automotive Electronics & Embedded Systems (AE&ES) jointly for another **two batches only** commencing from Academic Year 2015-2016.

It has also been mutually agreed by both the parties that -

1) The new batch of M Tech (AE&ES) for the Academic Year 2016-2017 will be renamed as M Tech in Electronics Engineering with specialization in Automotive Electronics with a minimum strength of 15 students.

This agreement further witnesseth that -

- The aforementioned original Memorandum of Understanding forms an annexure to this agreement.

In witness whereof the parties have caused this agreement to be signed by their duly authorized representatives.

Signed this day the 18th day of March, 2016.

For and on behalf of **VELTECH Dr. RR & Dr. SR Technical University, Chennai**	For and on behalf of **The Automotive Research Association of India, Pune**
Prof. Dr. Vel R Rangarajan, **Chairman, VELTECH Dr. RR & Dr. SR Technical University, Chennai** Tel: +91-44-26841622 / M: +91-9940024007 E-Mail: chancellor@vel-tech.org	**Mrs. Rashmi Urdhwareshe,** **Director, ARAI** Tel: +91-20-30231100 E-Mail: director@araiindia.com
Date: 18.3.16	Date: 18.3.16
In the presence of -	
Dr. P Sarasu, Director R&D VEL TECH Dr.RR & Dr.SR Technical University Tel: +91-044-26840605 E-Mail: sarasu@veltechuniv.edu.in	**Dr. K C Vora,** Sr. Deputy Director & Head, ARAI Academy Tel: +01-20-30231240 / M: +919975581049 E-Mail: vora.pga@araiindia.com
Date: 18.3.16	Date: 18.3.16

MOU - 13(c)



महाराष्ट्र MAHARASHTRA ◐ 2018 ◐ AN 847984

अ. क्र. 61680 दि. 15.1.19

मु. शु. रकमेचा ..... रु. 200/-

दस्ताचा प्रकार ..... M.O.U.

दस्त नोंदणी करणार आहेत का ? होय / नाही

मिळकतीचे वर्णन .....

मुद्रांक विक्री परवानाधारकाचे नांव ..... ARAI Kothrud, Pune

पक्षकाराचे नांव ..... Vel-Tech University, Chennai

हस्त व्यक्तीचे नांव व पत्ता ..... Mahesh Savkale

सह दुय्यम निबंधक हवेली क्रमांक १० यांचे कार्यालयासाठी मुद्रांक खरेदी केला असल्याने सदरचा दस्त हा कार्यालयापासून ५ कि.मी. हद्दीत आहे.

मुद्रांक विक्रेत्याची सही

आर. एस. कंचिनकोटी
परवाना क्र. २२०१०५३
महाडकर चेंबर्स, कोथरुड, पुणे-३८
फो.न ०२०-२५४०३४५ २५४५/१

सह दुय्यम निबंधक हवेली क्र. १० पुणे
- 9 JAN 2019
प्रथम सुमारे लिपीक
कोथरुड पुणे करिता

Agreement of Renewal of Memorandum of Understanding (MoU)

Between

Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai
Formerly known as "Veltech Dr. RR & Dr. SR Technical University"

and

The Automotive Research Association of India (ARAI), Pune

This Second renewal to the Memorandum of Understanding is made this 16th day of January 2019 (the "Effective Date") at Pune by and between, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology (hereinafter referred to as Vel Tech) and the Automotive Research Association of India (ARAI), a Registered Society and an Industrial Research Organization formed by the Indian Automotive Industries and the Ministry of Heavy Industries and Public Enterprises, Government of India, located at Pune, (hereinafter referred to as ARAI). (each, a "Party", and together, the "Parties").

WHEREAS, Vel Tech and ARAI had earlier entered in to MoU on 7thOctober 2011 to jointly offer a two-year M.Tech Programme in I C Engines as well as M.Tech Programme in Automotive Electronics & Embedded System for five batches.

WHEREAS, the Parties, agreed and signed 1st renewal of the MoU effective as of March 18, 2016 and extended the validity of the MoU to run the said M.Tech Programme in I C Engines jointly for another four batches commencing from Academic Year 2015-2016.

WHEREAS, the parties note with satisfaction that M.Tech Programme in I C Engines has been very successful and 7 batches of students have completed their study. The 8th batch has finished its first year and entered into their second year in 2018-19 at ARAI. The 9th batch has joined Vel Tech in their first year in 2018-19.

Except as expressly modified herein, all terms, conditions, and provisions of the MoU and first renewal shall remain in full force and effect.

NOW THEREFORE, Vel Tech and ARAI, therefore agree to extend the validity of the MoU signed on 7th Oct 2011 and renewed on 18th March 2016, to run 5 more batches from Academic year 2019-20 and rename the Programme M.Tech I C Engines to **M Tech in Automobile Engineering (with specialization in Powertrain Engineering / Electric and Hybrid Vehicles)** with a maximum intake of 36 students.

This agreement further witnesseth that -

- The aforementioned original MoU and 1st renewal form annexures to this agreement.
- The name of VelTech Dr RR & Dr SR Technical University has been changed to Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology w.e.f October 2017.
- Vel Tech and ARAI will share the fees collected from the students in the ratio of 60:40 respectively. On ARAI's share of 40, ARAI will apply GST at the prevailing rate (which is currently 18%). Any other taxes as and when become applicable will be charged to Vel Tech at actuals.

In witness whereof the parties have caused this agreement to be signed by their duly authorized representatives.

Signed this day the 16th Jan 2019

For and on behalf of **Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai**	For and on behalf of **The Automotive Research Association of India, Pune**
Prof. Dr. Vel R Rangarajan, **Founder Chancellor & President, Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai** Tel: +91-44-26841622 E-Mail: president@veltechuniv.edu.in	**Mrs. Rashmi Urdhwareshe,** **Director, ARAI, Pune** Tel: +91-20-30231100 E-Mail: director@araiindia.com
Date: 16-JAN-2019	Date: 16-JAN-2019
In the presence of -	
Mr. K V D Kishore Kumar, Vice President, Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai Tel: +91-044-26840605 E-Mail: vicepresident@veltech.edu.in	**Dr. K C Vora,** Sr. Deputy Director & Head, ARAI Academy, Chakan Pune Tel: +91-2135-396660 E-Mail: vora.pga@araiindia.com
Date: 16-JAN-2019	Date: 16-JAN-2019

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

Date:
10th Feb 2022

MOU signed with ARAI

MOU Number	**MOU -13**
Name of the Organization	M/s. The Automotive Research Association of India, Pune
Date of signing of MoU	2.12.2009,
Date of MoU Renewal (If any)	18.03.2016, 17.03.2019
Next renewal due on	
Objectives of MoU	1. To offer collaborative graduate, Post graduate and doctoral programmes, 2. Collaborative Research & Joint Academic meetings, 3. Hosting of Joint Academic, Cultural Symposia, conferences, workshops and meetings.

Academic Year	No. of Students	Course	Purpose
2016-17	20	M.Tech	PROJECT
2016-17	04	M.Tech	Placement
2017-18	25	M.Tech	PROJECT
2018-19	28	M.Tech	PROJECT

Dean Industry Relations & TBI

MoU Coordinator

Dr. P. Chandrakumar
Dean
Industry Relations & TBI
Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

No.42, Avadi-Vel Tech Road, Vel Nagar,
Avadi, Chennai - 600 062, Tamil Nadu, India.
Landline : +91 44 2684 0262 / 2684 0605
Toll Free : 1800 212 7669
Email : registrar@veltech.edu.in
Website : www.veltech.edu.in

CERTIFICATE

This is to certify that the dissertation work titled "**Piston Bowl Shape Modification to Improve Engine Performance and Emission Characteristics of Naturally Aspirated Diesel Engine**" is submitted by **SAKTHIVEL. ST** bearing registration Number **14PEIC4017** to the School of Mechanical and Construction Engineering of the VELTECH Dr. RR & Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **VELTECH Dr. RR & Dr.SR Technical University, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. AATMESH JAIN
Engineer, Course coordinator,
ARAI Academy
The Automotive Research Association of India

Dr. S. SENTHILKUMAR
(Project Guide)
Associate Professor
School of Mechanical and Construction Engineering
Vel Tech University

Dr. BRIJESH PATEL
Deputy Manager,
ARAI Academy,
The Automotive Research Association of India

Dr. K. C. VORA
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. _____

2. _____

Date of Submission: 09/06/2016

CERTIFICATE

This is to certify that the dissertation work titled "**Emission Reduction Using Blends of Thevetia Peruviana Seed Oil with Diesel on Naturally Aspirated Diesel Engine**" is submitted by **ROHIT SREENIVAS** bearing registration Number **14PEIC4016** to the School of Mechanical and Construction Engineering of the VELTECH Dr. RR & Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **VELTECH Dr. RR & Dr.SR Technical University, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. AATMESH JAIN
Engineer, Course coordinator,
ARAI Academy
The Automotive Research Association of India

Dr. S. SENTHILKUMAR
(Project Guide)
Associate Professor
School of Mechanical and Construction Engineering
Vel Tech University

Dr. K. C. VORA
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. _____

2. _____

Date of Submission: 9-06-2016

CERTIFICATE

This is to certify that the dissertation work titled "**Reduction of port to port swirl ratio variation in a Multi cylinder diesel engine through simulation and optimization of intake manifold using 3D CFD software**" is submitted by **ARAVIND H** bearing registration Number **14PEIC4003** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **The Automotive Research Association of India, Powertrain Engineering Department** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

K R SAMPATHKUMAR
Manager
PTE, ARAI

N V MARATHE
Sr. Dy. Director & Head
Powertrain Engineering
The Automotive Research Association of India

N MURUGUNACHIPPAN
Assistant Professor
Automobile Engineering
Veltech University

Dr. K. C. VORA
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1.

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Date of Submission: /06/2016

Scanned by CamScanner

CERTIFICATE

This is to certify that the dissertation work titled "**Optimizing Engine Thermal Management by using Simulation approach**" is submitted by **Gudi Ajay Kumar** bearing registration Number **14PEIC4004** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at PTE Department, ARAI by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Abhishek Jamkhande
Dy. Manager
PTE

N.V. MARATHE
Sr. Dy. Director & Head
Power Train Engineering
The Automotive Research Association of India

N. Murugunachippan
Assistant Professor
School of Mechanical Engineering
Veltech University

Dr. K. C. Vora
Sr. Dy. Director & Head
ARAI Academy
The Automotive Research Association of India

Internal Examiner

External Examiner

1. _____

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Date of Submission: -06-2016

CERTIFICATE

This is to certify that the dissertation work titled "EFFECT OF LEAN AND STOICHIOMETRIC COMBUSTION ON SI-DI ENGINE PERFORMANCE USING 1-D SIMULATION" is submitted by **Siddaling Bhure** bearing registration Number **14PEIC4019** to the Department of Automobile Engineering of the Vel Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **The Automotive Research Association of India, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Dr. S. S. Thipse
Deputy Director
Powertrain Engineering Department
The Automotive Research Association of India

K.P. Kavathekar
Deputy General Manager
Powertrain Engineering Department
The Automotive Research Association of India

Mr. G. Sugash
Asst. Professor
School of mechanical and construction engineering.

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. B. S. B

2. _____

Date of Submission: 03/06/2016

CERTIFICATE

This is to certify that the dissertation work titled **"SIMULATION OF ELECTRICAL MOTOR FOR ELECTRIC VEHICLE AND HYBRID ELECTRIC VEHICLE TESTING"** is submitted by **SIVARAMAN K** bearing registration Number **14PEAE4004** to the School of Mechanical of the Vel-Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Automotive Electronics and Embedded Systems.** This is a bonafide work carried out at **Automotive Research Association of India, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Apurva J Desai,
Engineer,
Automotive Electronics Department,
Automotive Research Association of India

Mr. Manoj M Desai
Deputy General Manager,
Automotive Electronics Department,
Automotive Research Association of India.

Dr. Sanjay Patil
Deputy General Manager,
ARAI Academy,
Automotive Research Association of India.

Mr. D. Surender
Assistant Professor.
Department of Electrical Engineering,
Vel-Tech Dr.RR & Dr.SR Technical University.

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
Automotive Research Association of India.

Internal Examiner

External Examiner

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Date of Submission: 13/ 6 /2016

CERTIFICATE

This is to certify that the dissertation work titled "**Analysis of Heat Balance of an Inline 6 Cylinder Engine and provide methods to improve Thermal Efficiency upto 5%**" is submitted by **Suresh Anand .J** bearing registration Number **14PEIC4020** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Ashok Leyland Technical Centre, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Umashankar .N
Assistant General Manager
Engines-PD
Ashok Leyland Technical Centre, Chennai.

Dr. Brijesh Patel
Deputy Manager
ARAI Academy
The Automotive Research Association of India

Dr. Amala Justus.M
Head Of the Department
Department of Automobile Engineering
Veltech University

Mr. Senthil Kumar.G
Divisional Manager
Alternate Energy Systems
Ashok Leyland Technical Centre

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

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Date of Submission: 06/2016

Certificate

CERTIFICATE

This is to certify that the dissertation work titled "**REDUCTION IN FUEL CONSUMPTION BY THE OPTIMIZATION OF DFCO, GEAR BASED SPEED CONTROL AND DUAL MODE**" is submitted by **Mr. Tanuj Gupta** bearing registration Number **14PEIC4022** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Advantek Fuel Systems Pvt. Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Vishal Singhal
Technical Director
Advantek Fuel Systems Pvt.Ltd

Dr. Jaichander
Professor
Veltech University

Dr. Brijesh Patel
Dy. Manager
ARAI Academy
The Automotive Research Association of India

Dr. K C Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner
1.
2.

Date of Submission: 06/06/2016

CERTIFICATE

This is to certify that the dissertation work titled "**Development & simulation of a dual loop EGR controller system for a diesel engine**" is submitted by **Vineet Bhat** bearing registration Number **14PEIC4024** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **ARAI Academy, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Dr. S. A. Patil
Deputy General Manager
ARAI Academy
The Automotive Research Association of India

Mr. G. Sugash
Asst. Professor
Department of Automobile Engineering
Veltech University

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1.

2.

Date of Submission: 26 /08/2016

CERTIFICATE

This is to certify that the dissertation work titled "**DESIGN AND EXPERIMENTAL STUDY OF INTAKE SYSTEM ON EXISTING GREAVES MK20 ENGINE**" is submitted by **D.PARTHIPAN** bearing registration Number **14PEIC4012** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **GREAVES COTTON LIMITED, FEB, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

for 31/5/2016
Mr.P.PALANIVELU,
Senior Manager,
Engine R&D

K. Saravanan
Mr.K.Saravanan,
Engineer-Course Coordinator,
ARAI Academy,
The Automotive Research Association of India

Mr.P.B.Senthil Kumar,
Assistant Professor,
Automobile,
Veltech University.

31/5/2016
Mr.A.SENTHILKUMAR,
Deputy General Manager-Engine R&D,
Technology Centre, Farm Equipment Business,
Greaves Cotton Limted.

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. BS

2.

Date of Submission: 8/6/2016

CERTIFICATE

This is to certify that the dissertation work titled "**Friction Reduction in Engine**" is submitted by **C.Priyadharshan** bearing registration Number **14PEIC4014** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **FEV India Pvt Ltd** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr.Vivek Rai
Sr.Manager, IN-BOT-Mechanical Testing
FEV India Pvt Ltd

Mr.Aatmesh Jain
Engineer, ARAI Academy,
The Automotive Research Association of India

Mr.Selvamuthukumar
Assistant Professor,
Department of Mechanical Engineering,
Veltech University

Mr. Bhavesh Javale
Engineer, ARAI Academy,
The Automotive Research Association of India

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1.

2.

Date of Submission: 8/06/2016

CERTIFICATE

This is to certify that the dissertation work titled **"Development of Light Weight Engine Parts with ADI (Austempered Ductile Iron) Material"** is submitted by **R. Hari Krishnan** bearing registration Number **14PEIC4006** to the Department of Automobile Engineering of the VelTech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Ashok Leyland Technical Centre, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

N. Umashankar

Mr N. Umashankar
A.G.M, ENGINES –PD
Ashok Leyland Technical Centre, Chennai

K. Saravanan

Mr. K. Saravanan,
Faculty Engineer
The Automotive Research Association of India
Pune

Mr. K. ARUNKUMAR
Asst Professor,
VelTech University,
Chennai

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. B S R

2. _____

Date of Submission: 8/06/2016

CERTIFICATE

This is to certify that the dissertation work entitled, "**Development of mechanism for variable compression ratio and cylinder deactivation in IC engine**" is submitted by **Raman Suresh Shendge** bearing registration number **14PEIC4018** to School of Mechanical Engineering of the VELTECH University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment for the degree of **Master of Technology in IC ENGINE.** This is a bonafide work carried out at **Automotive Research Association of India,** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. N.V. Marathe,
Sr. Deputy Director & Head of PTE
Automotive Research Association of India

Mr. N.V. Marathe,
Sr. Deputy Director & Head of PTE
Automotive Research Association of India

Mr. D Samuelraj
Assistant Professor, VELTECH University
School of Mechanical Engineering

Dr. K. C. Vora
Sr. Deputy Director & Head,
ARAI Academy,
Automotive Research Association of India

Internal examiner

External examiner

1. BS

2. _____

Date of Submission: 1st Jun 2016

CERTIFICATE

This is to certify that the dissertation work titled "**SIMULATION AND OPTIMISATION OF HYBRID CVT CONCEPT FOR CITY BUS IN INDIA**" is submitted by **N Ravi Teja** bearing registration Number **15PFIC4015** to the School of Mechanical of the Vel-Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Deccan Auto Ltd Hyderabad and Automotive Research Association of India, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Rao M Chala

Dr. Rao Chalasani
General Manager,
Deccan Auto Ltd. Hyderabad.

Mr. KP Wani
Manager,
ARAI Academy,
Automotive Research Association of India.

Mr. N. Murugu Nachiappan
Assistant Professor,
Department of Electrical Engineering,
Vel-Tech Dr.RR & Dr.SR Technical University.

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
Automotive Research Association of India.

Internal Examiner

External Examiner
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2.

Date of Submission: 08 06 2016

CERTIFICATE

This is to certify that the dissertation work titled **"To reduce setup time for engine at CTCI test cell using "SMED" concepts"** is submitted by Himanshu Patel bearing registration Number **14PEIC4013** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **CUMMINS INDIA LTD., Kothrud, Pune,** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Santosh pathrudkar
Senior manufacturing engineer
ITC LOFE Support

Aatmesh Jain
Engineer
ARAI Academy
The Automotive Research Association of India

Mr. Arunkumar
Assistant professor
Department of Automobile engineering
Veltech University

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner
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Date of Submission: 3/6/16

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CERTIFICATE

This is to certify that the dissertation work titled "**Crankshaft analysis and redesign for 15% increase in Peak Firing Pressure (PFP) on the existing H6 crankshaft**" is submitted by **A. Kannan Swamy** bearing registration Number **14PEIC4008** to the Department of Automobile Engineering of the VelTech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Ashok Leyland Technical Centre, Vellivoyalchavadi, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

N. Umashankar

Mr. N. Umashankar
A.G.M, Engines –PD
Ashok Leyland Technical Centre, Chennai

Dr. Brijesh Patel
Deputy Manager
The Automotive Research
Association of India
Pune

Mr. H. Gouthamkumar
Asst Professor
VelTech Technical University
Avadi- Chennai

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research
Association of India

Internal Examiner

External Examiner

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Date of Submission: /06/2016

CERTIFICATE

This is to certify that the dissertation work titled "**Advancement in "ACT CAN DONGLE" for Gathering Information of Vehicle Environment**" is submitted by **Padol Kiran Narayan** bearing registration number **14PEAE4003** to the School of Mechanical and Department of Automobile Engineering of the **VEL TECH University**, Chennai and ARAI Academy, **The Automotive Research Association of India, Pune**, in partial fulfilment of the requirements for the degree of **Master of Technology** in **Automotive Electronics & Embedded Systems**. This is a bonafide work carried out at Tata Motors Ltd, Pune, by him under our supervision. The contents of this dissertation, in full or parts have not been submitted to any other institute or university for the award of any degree.

Prasanta Sarkar

Mr. Prasanta Sarkar
DGM,
Advance Engineering, TML

Dr. Sanjay A Patil
Deputy General Manager,
ARAI Academy,
The Automotive Research Association of India

Mr. Selvamuthukumar
Professor,
VEL TECH University

Dr. K C Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India.

Internal Examiner

External Examiner

1. _____

2. _____

Date of Submission: 13 / 06 / 2016

Scanned by CamScanner

CERTIFICATE

This is to certify that the dissertation work titled "Simulation and Evaluation of different injection parameters and Compression ratio on performance of SI-DI Engine" is submitted by MUBEEN S. MAPKAR bearing registration Number 14PEIC4010 to the Department of Automobile Engineering of the Veltech University Chennai, and ARAI Academy. The Automotive Research Association of India Pune, in partial fulfilment of the requirements for the degree of Masters of Technology in IC Engine. This is a bonafide work carried out at ARAI Pune by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Dr. S S Thipse
Deputy Director
Powertrain Engineering Department
The Automotive Research Association of India

Mr. K P Kavathekar
Deputy General Manager
Powertrain Engineering Department
The Automotive Research Association of India

Mr. H Goutham Kumar
Department of Automobile Engineering
Veltech University

Dr. K C Vora
Sr. Deputy Director & Head
ARAI Academy
The Automotive Research Association of India

External Examiner

1. _____

2. _____

Date of Submission: 03/06/2016

Scanned by CamScanner

CERTIFICATE

This is to certify that the dissertation work titled "**Design & Development of Manufacturing Process for Cylinder Head Assembly Line in I.C. Engine Remanufacturing**" is submitted by **Ms. Ananya Krishnan** bearing registration Number **14PEIC4001** to the Department of Automobile Engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Cummins ReCon, Pithampur** by her under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

MAYUR WAGH

Mr. Mayur Wagh
Sr. Manager
Manufacturing Engineering

Mr. Fakkir Mohammad
Asst. Professor
Mechanical Engineering
Veltech University

Mr. Navdeep Deshmukh
Dy. Manager
ACY - FD
The Automotive Research Association of India

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

External Examiner

1. _____

2. _____

Date of Submission: / /

CERTIFICATE

This is to certify that the dissertation work titled "**Performance Improvement and Emission Reduction by Optimizing Fuel Injection for Ethanol Blended Diesel Naturally Aspirated Engine**" is submitted by **N.ANIROODH** bearing registration Number **14PEIC4002** to the School of Mechanical and Construction Engineering of the VELTECH Dr. RR & Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **VELTECH Dr. RR & Dr.SR Technical University, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. AATMESH JAIN
Engineer, Course coordinator,
ARAI Academy
The Automotive Research Association of India

Dr. S. SENTHILKUMAR
(Project guide)
Associate Professor
School of Mechanical and Construction Engineering
Vel Tech University

Dr. K. C. VORA
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. _____

2. _____

Date of Submission: 9-6-2016

HRM&A/REC/ 02

8th Jan. 2016

Shri. Sivaraman Kumarasamy
Flat No.150, Sargam Socy.,
Paud Road, Bhusari Colony
Near Lohia Jain IT Park
Kothrud, Pune: 411038
sivaramanmts@gmail.com

Dear Sir,

Sub: Offer for the post of 'Trainee Engineer' in ARAI

With reference to the interview you had with us on 18th Dec. 2015, you are being offered an appointment with *ARAI*, as **'Trainee Engineer'** for a specific Project Work, for a period of One Year, w.e.f. 1st July 2016.

You will be paid a Stipend of Rs.17,000/-p.m., plus Location Subsidy and Incentive as applicable during your training period. (The Incentive differs from year to year and department to department, depending upon various criteria). This Stipend is not in any way linked with any increase in Dearness Allowance etc. as applicable for regular employees.

Please find enclosed herewith the Terms & Conditions of appointment in *ARAI*, which are applicable to your category.

You will be entitled to the leave, as per the existing rules and regulations in *ARAI*, applicable to your category. You will enjoy the closed holidays as declared for 2016 subject to any change, falling during your employment with *ARAI*.

After completion of successful training of one year, your services will be considered for regularization as "Engineer", with a Basic Pay of Rs. 12,540/- + Grade Pay of Rs. 4,600/- p.m., in the pay-scale of Rs. 9300-34800 with allowances and incentive, as applicable to the *ARAI* employees from time to time.

In case you are agreeable to accept this offer, you are required to join the duty on 1st July 2016. Accordingly, return the 'Form of Acceptance of appointment' (attached to this letter), duly filled in, giving your concurrence on this offer, at the earliest.

You are requested to bring along with you the certificate regarding qualification & mark sheets in original with one Xerox each duly attested, one recent passport size coloured photograph, two postal stamp size photographs **(with red background and light blue shirt)** and blood group report, for identify-cum-punching card.

Thanking you,

Yours faithfully,
For The *ARAI*

Uchgaonkar 8/1/2016.

DR. M.V. UCHGAONKAR
.DEPUTY DIRECTOR
HEAD - HR MANAGEMENT & ADMIN.
uchgaonkar.pah@araiindia.com

Encl: 1. Terms and Conditions of Appointment 2. Letter of Acceptance

SPARK MINDA
ASHOK MINDA GROUP

Powered by Passion

12th Sept 2016

Mr. Kiran Padol
F-25, Maitreya Baug,
Kothrud,
Pune- 411038

APPOINTMENT LETTER

Dear Mr. Padol,

This has reference to your application and subsequent discussions you had with us, we are pleased to appoint you in the position of **"Senior Engineer – Software Development" (Level-VA)** for **SMIT** effective from **12th Sept 2016** on the following terms and conditions.

Your salary and perquisites shall be as follows:

a. Basic – Rs. 25,137/- (Rupees Twenty Five Thousand One Hundred Thirty Seven Only) per month.

b. H.R.A. – Rs. 7,541/- (30% of the basic salary per month.)

In addition you will be entitled for other benefits and perquisites as per the policy of the company applicable to your level / position.

You will be subject to other rules and regulations applicable to the management staff of our company with which you should make yourself familiar before accepting this appointment.

It is clearly understood that you will work only for the company or our associate Companies and will not take up any employment or any place of profit with any other organization without our sanction in writing.

Please confirm your acceptance of the appointment by signing and indicating your Date of joining duty in the duplicate of this letter.

Yours sincerely,

For **Minda Corporation Ltd.**

Manisha

Suresh D
CEO – Spark **Minda Technical Center**

Mahindra

Mahindra & Mahindra Ltd.
Automotive & Farm Equipment Sectors
Mahindra Towers, Akurli Road,
Kandivli (East) Mumbai 400 101 India

mahindra.com

Regd. office:
Gateway Building, Apollo Bunder,
Mumbai 400 001 India

Date: 04/05/2016
Ref: HR/PGET/2016084

Mubeen Mapkar
Room No 4, Taj Mansion Building,
Shastri Nagar, Khopoli, Maharashtra-410203

Dear Mubeen,

We have pleasure in offering you appointment in Automotive & Farm Equipment Sectors as a Post Graduate Engineer Trainee (PGET).

This offer of Training is subject to your satisfying the following:

a. Your written undertaking to join, not later than **17.08.2016**.
b. Certification of your medical fitness by the Company authorised doctor, and
c. Submission of all your necessary certificates and documents in respect of educational and professional qualifications, proof of age and project experience, as per the requirements of the Company.
d. Subject to you passing your graduation without any backlogs before the date of joining.

This appointment will commence from the date on which you join the Company. A joining note to that effect will be issued to you.

The terms and conditions of employment shall be as under:

1 During the one year training you will receive emoluments / allowances as per the attached Annexure.

2 Performance pay will be paid as per company policy only after completion of one year of service as a confirmed employee.

3 The age of superannuation will be sixty years (On the strength of the bio-data submitted by you, we have recorded your date of birth as **20.09.1991**.

4 With effect from the date of commencement of your training, you are required to become a member of the Mahindra & Mahindra Limited Staff Provident Fund.

5 You are liable to be placed for service at our discretion at any of the Company's establishments/departments/divisions anywhere in India as also the Associate Companies, JV's and subsidiary Companies of Mahindra & Mahindra Ltd.

6 You will undergo training for a period of twelve months. However, this training period could be curtailed or extended at the discretion of the Company. Completion of twelve months of training does not entitle you or result in automatic confirmation, unless confirmed in writing.

7 Trainees will be entitled to 20 days Exigency Leave on pro-rata basis (inclusive of plant shutdown days which is applicable for Trainees at plant location.) Accumulated leave cannot be encashed or carried forward at the end of the training period.

8 Gratuity/Provident Fund/ Superannuation will be applicable as per the rules of the Company.

9 The Company will be entitled to terminate your services by giving 1 month written notice or 1 month salary including allowances in lieu of such notice. In the event of your resignation from the services of the Company, you will be required to give the Company, 1 month written notice or forfeit, in lieu thereof, your salary, including allowances, for one, or pro-rata for the period by which your notice falls short of 1 month.

10 You shall not be entitled to adjust your notice period against any leaves, if any, standing to you credit.

Mahindra

11 Further, on confirmation :

a) You will be entitled to Privilege Leave, as per the rules thereof;

b) Medical Benefits, for self and family will be applicable as per the rules of the Company.

c) The Company will be entitled to terminate your services by giving 3 Months written notice or 3 Months salary including allowances in lieu of such notice. In the event of your resignation from the services of the Company, you will be required to give the Company, 3 Months written notice or forfeit, in lieu thereof, your salary, including allowances, for 3 Months, or pro-rated for the period by which your notice falls short of 3 Months.

d) You shall not be entitled to adjust your notice period against privilege leave, if any, standing to you credit.

12 So long as you are in the employment of the Company., you will, at all times, observe secrecy and confidentiality and will not divulge, disclose or make known to any unauthorised person within or outside the Company, nor will you unauthorisedly use any knowledge or information in respect of manufacturing, technical trade or business data (including manufacturing processes, technical know-how, customer information, business plans and like matters) which are necessarily confidential and have come to your knowledge and possession.

13 You will also not remove any such information in any form whatsoever from the Company premises, nor copy or transmit the same unauthorisedly through any medium including social networking networks/ public sites, nor will you grant permission to assist, permit entry to, or in any manner co-operate with any unauthorised person for the purposes of accessing, obtaining, copying, transmitting or removing the above. Even after the cessation of your employment with the Company, you will not use, divulge, disclose or remove in any manner whatsoever confidential information of the type described above of which you were in possession whilst in service to the detriment of the Company.

14 You will also observe all the confidentiality measures which are in existence, or which may be enforced from time to time, as well as directions as to confidentiality marked on any communication, document, electronic data storage device etc. You shall indemnify and hold Company harmless and indemnified against any damage or loss caused to the Company on account of breach of confidentiality on your part. These confidentiality provisions shall survive the separation of your employment with the Company, either by way of retirement or termination or otherwise.

15 In addition to your fulfilling the requirements of secrecy and confidentiality, as specified herein, also during your employment with the Company, you shall not engage in any vocation, training, employment, consultancy, business, transaction, or any other activity, which is in conflict with the interests of the Company, in any capacity whatsoever either on your own or in association with any other individual/firm/institute/body corporate, etc., whether for any consideration or not.

16 You will devote your full attention exclusively to the duties entrusted to you from time to time by the Company and while in service of this Company you will not work for any person or Company in any capacity either for any consideration or otherwise, nor do any private business without obtaining prior permission of the Company in writing.

17 You will assign to the Company your entire right, title and interest in any Intellectual Property Rights (IPRs for short, which term would include patents, trade-marks, copyrights, designs, whether registered or not, and all improvements thereto) that you may make, solely or jointly with others, in the course of your employment with the Company relating to any or all systems, services and products manufactured or marketed or leased or developed. You will perform all necessary acts and execute such documents in such format as may be required by the Company, without expense to you, which in the judgment of the Company or its Attorneys may be necessary or desirable to secure to the Company full right title and interest in the IPRs.

18 The Company shall at all times have the right to access and monitor all e-mails created, sent / received or stored by you using Company facility and on Company's system at any time without giving you any prior notification. All such data and information shall be the property of the Company at all times.

19 You shall endeavor to uphold the good image of the Company and shall not by your conduct adversely affect the reputation of the Company and bring disrepute to the Company, in any manner whatsoever.

Mahindra

20 You shall, on ceasing to be the employee of the Company, forthwith return all Company properties, movable and immovable, including, without limitation, all Company information, files, reports, memoranda, software, credit cards, door and file keys, computer access codes and such other property which you received or in possession or prepared in connection with your employment with the Company.

21 Any joining expenses reimbursed or any payment made to you while joining by the Company will be recovered in the event you leave the organization within two years of joining.

22 You will be subject to all rules, regulations and policies of the Company, which may be in force from time to time.

23 On successful completion of training you will be paid a onetime **Special Pay** amount of **90,000 /- (Rupees Ninety Thousand Only).**

Please return the duplicate of this letter, duly signed in token of your acceptance by **17.08.2016** of the above mentioned terms and conditions of this employment.

We wish you a long and fruitful career with us.

With Regards,

Yours Sincerely,
For MAHINDRA & MAHINDRA LIMITED

Atul Joshi
Head – HR
AD, IO & MVML

If the above conditions are not satisfied/fulfilled on or before **17.08.2016**, this letter of appointment will become null and void and will stand cancelled.

Accepted:
(Name & Signature of Candidate)

_____

_____

CC : Accounts
CC: CIS / ER & D/ER
CC: Human Resources / MIBS
CC: PF Section

Stay Ahead

BANNARI AMMAN INSTITUTE OF TECHNOLOGY

An Autonomous Institution Affiliated to Anna University - Chennai • Approved by AICTE • Accredited by NBA & NAAC with "A" Grade
SATHYAMANGALAM - 638 401 ERODE DISTRICT TAMIL NADU INDIA
Ph : 04295-226000 / 221289 Fax : 04295-226666 / 223775 E-mail : bitsathy@bannari.com Web : www.bitsathy.ac.in

LETTER OF INTENT

BET/LOI/2016 18.6.2016

Sub: Bannari Amman Institute of Technology, Sathyamangalam – Intimation of Provisional Selection – Reg.

Ref: Interview held on 18.6.2016 at Coimbatore.

With reference to your application and the subsequent interview held on 18.6.2016, we are pleased to intimate that you are provisionally selected for appointment as **ASSISTANT PROFESSOR** in the faculty of **AUTOMOBILE ENGINEERING** at Bannari Amman Institute of Technology.

We request you to kindly communicate your willingness to accept the aforesaid offer. The appointment order containing the terms and conditions of your service, duties and responsibilities will be issued to you at the time of reporting for duty.

For **BANNARI AMMAN INSTITUTE OF TECHNOLOGY**

PRINCIPAL

BANNARI AMMAN INSTITUTE OF TECHNOLOGY Stay Ahead 638401 SATHYAMANGALAM

To

Mr R NAGARAJAN
16 - Sonaikaruppu Kovil Street
Thirumangalam
Madurai - 625 706

BANNARI AMMAN INSTITUTE OF TECHNOLOGY
An Autonomous Institution Affiliated to Anna University - Chennai • Approved by AICTE • Accredited by NBA & NAAC with "A" Grade
SATHYAMANGALAM - 638 401 ERODE DISTRICT TAMIL NADU INDIA
Ph : 04295-226000 / 221289 Fax : 04295-226666 / 223775 E-mail : bitsathy@bannari.com Web : www.bitsathy.ac.in
Stay Ahead

12.7.2016

BIT/ORDER/1054/2016

Mr R Nagarajan
16 - Sonai Karuppu Kovil Street
Thirumangalam
Madurai - 625 706

ORDER

With reference to your application and subsequent interview you had on 18.6.2016 Mr R NAGARAJAN is appointed as **ASSISTANT PROFESSOR** in the Department of AUTOMOBILE ENGINEERING in Bannari Amman Institute of Technology on a Basic Pay of ₹ 21,600/- (in the scale of 15600-39100 plus Academic Grade Pay of ₹ 6,000/-) and a DA of ₹ 6,480/- per month from the date of joining. You will be eligible to receive Provident Fund of ₹ 1,800/- per month, with the condition that you will also contribute a like sum every month.

Your appointment will be effective from the date of your joining duty and you will be on probation for a period of one year from the date of joining. You will be considered for regular appointment based on the demonstration of merit and ensuring the attainment of learning outcomes of students. During the period of probation, you will not be entitled to any other benefits or allowances or amenities unless and otherwise explicitly specified by Bannariamman Educational Trust either in this order or in future communication.

You are bound by the Rules and Regulations now in force at the Institution and as may be amended in future.

You will be under the administrative control of the Principal, Bannari Amman Institute of Technology and academic control of the Head of the Department of Automobile Engineering. You will carry out any other work assigned by the Principal and the Management of the Institution. You will also attend to any work entrusted by the Bannariamman Educational Trust from time to time.

You will not be permitted to resign from the post offered in this order during the middle of an academic year. A request for relief / resignation from the post can be entertained only at the end of an academic year, in which case an advance notice of three months should be given by you to the undersigned or in lieu, three months of emoluments drawn by you should be paid to the Institution. However the Management of the Institution reserves the right to terminate your services at any point of time without assigning reasons thereto.

You have to produce the following documents in original at the time of joining duty:

I. All certificates for qualifications (SSLC, HSC Mark sheets, Degree / Diploma UG / PG / PhD in original)

II. Two copies of recent photograph (one passport size and the other stamp size).

TERMS & CONDITIONS

1. You shall devote your whole time to the duties in the Institution and shall not on your own account or otherwise either directly or indirectly carry on or be concerned in any trade / business or canvassing work, private tuition or the like of remunerative kind or of honorary nature without the specific written permission of the Institute's authority.
2. Your duties and responsibilities include the following: -

i. To observe punctuality and conduct lecture classes, laboratory practicals, tutorials and attend to all other academic, co-curricular and extra-curricular activities efficiently and to the best satisfaction of students.

ii. To participate actively and diligently in the development of Laboratories and the experiments to be prescribed in the curriculum of your Department in particular and the Institution in general.

iii. To keep abreast of the latest developments in the subjects handled by you in order to promote meritorious performance of students and to ensure high percentage of pass in the examinations.

..3..

iv. Strive to improve the effectiveness of teaching, stimulate analytical and rational thinking, develop and apply appropriate teaching techniques and materials - novel or innovative - which will create interest, understanding and enthusiasm amongst students.

v. Keep accurate records of academic standing of each student in his classes, and to furnish in promptly all reports of grades and other information required by the HOD, Controller of Examination, Placement Officer and Principal as and when required.

vi. To maintain cordial relationship and good communication with students, colleagues and subordinates of your Department and other Departments and Centres.

vii. Undertake / pursue additional courses, Doctoral / Post-doctoral research, visit reputed laboratories and industries to update the current developments in your discipline.

viii. Present technical papers in national and international conferences in India and abroad.

ix. Maintain high levels of competency comparable and personal standards to that of members working with Institutions of national and international repute. Also, contribute to the management of quality, audit and other external assessments / surveys.

You are requested to sign the duplicate copy of this order as token of acceptance of the above terms and conditions and return the same to the office of Bannariamman Educational Trust, Coimbatore.

For BANNARI AMMAN INSTITUTE OF TECHNOLOGY

S. V.

CHAIRMAN

CERTIFICATE

This is to certify that the dissertation work titled **"Combustion Optimization of 90Hp Genset Engine to meet CPCB II norms"** is submitted by **Victor Debnath** bearing registration Number **15PEIC4024** to the School of Automobile Engineering of the Dr. RR & Dr SR Technical University, Veltech and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Escorts Agri-Machinery Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Yasheshwar Prajapati
Assistant Manager,
Engine Design,
Escorts Agri-Machinery Ltd.

Dr. Brijesh P. Patel
Engineer,
ARAI Academy,
The Automotive Research Association of India

Mr. Arunkumar. K
Assistant Professor,
School of Automobile Engineering
Veltech University

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

Date of Submission: 12-06-17

CERTIFICATE

This is to certify that the dissertation work titled **"Study and Comparison of Performance and Emission Characteristics of Four Cylinder DI CNG and MPFI CNG by Using 1D Simulation Tool"** is submitted by **"M.Vikneshwararaj"** bearing registration number **15PEIC4025** to the School of Automobile Engineering of the VeltechDr.RR& Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in I.C Engines**. This is abonafide of the work carried out at **"Force Motors Ltd, Pune."** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Mr. Mandar Joshi
Sr. General Manager, R&D-Powertrain,
Force Motors Ltd, Pune

Dr.Brijesh Patel
Dy. Manager,
ARAI Academy,
The Automotive Research Association of India

Mr.M.SelvaMuthukumar
Assistant Professor,
Dept. of Automobile Engineering,
Veltech University

Mr.Kamlesh Bhandari
Divisional Manager,
R&D-Engine Design
Force Motors Ltd. Pune

Dr. K. C. Vora
Sr.Dy.Director
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

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Date of Submission: 13/06/2017

CERTIFICATE

This is to certify that the dissertation work titled **"THERMODYNAMIC SIMULATION AND EXPERIMENTAL VERIFICATION OF 27 HP 4 STROKE 4 CYLINDER IDI DIESEL ENGINE"** is submitted by **SUMITH SHINDE** bearing registration Number **15PEIC4021** to the School of Mechanical and Construction Engineering of the Veltech Dr.RR & Dr.SR University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **CHRIST University, Bangalore** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

Dr.SHANKAR V
Professor & Principal Investigator
Department of Mechanical and Automobile Engineering
Christ University,

Dr.BRIJESH PATEL
Dy.Manager
ARAI Academy ,
The Automotive Research Association of India

Mr.N.MURUGU NACHIAPPAN
Assistant Professor
School of Mechanical and Construction Engineering
Veltech Dr.RR & Dr.SR University

Dr. K. C. VORA
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of India

Internal Examiner

External Examiner

1. _____

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Date of Submission: 06/07/2017

CERTIFICATE

This is to certify that the dissertation work titled "**MEASUREMENT & SIMULATION OF FRICTION POWER OF 2.2 LITER DIESEL ENGINE & ESTABLISH CO-RELATIONSHIP OF FRICTION POWER TO VEHICLE FUEL ECONOMY** " is submitted by **Tile Manoj H.** bearing registration Number **15PEIC4022** to the School of Automobile Engineering of the Dr. RR & Dr. SR University, Veltech and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Mahindra & Mahindra Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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Date of Submission: 12-06-17

CERTIFICATE

This is to certify that the dissertation work titled " DEVELOPMENT OF CONTROL FOR REGENERATIVE BRAKING IN HYBRID ELECTRIC VEHICLE." is submitted by SANGEETA VENKATESH bearing registration Number 15PEIC4023 to the Department of Automobile Engineering of the Vel-Tech Dr.RR & Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Masters of Technology in Internal Combustion Engines. This is a bonafide work carried out at THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA, Pune by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Predicting performance and emission of a 3 cylinder NA engine through turbocharging using 1-D Ricardo simulation tool**" is submitted by **Sachin Kumar** bearing registration Number **15PEIC4017** to the department of automobile engineering of the Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Force Motors Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled **"COMBUSTION SIMULATION AND EXPERIMENTAL CORRELATION FOR THE OPTIMIZATION OF INJECTION PARAMETERS IN 3.77 LTS ENGINE USING SIMULATION TOOL"** is submitted by **SANTHOSH KUMAR V** bearing registration number **15PEIC4018** to the Department of Automobile Engineering of Veltech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in IC Engines**. This is a bonafide work carried out at **VE Commercial Vehicles Ltd, Pithampur** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Combustion Optimization of 75 HP Agricultural Tractor Diesel Engine to Meet the Bharat Stage (Trem) III A Emission Norms**" is submitted by **Shishir Shrivastava** bearing registration Number **15PEIC4020** to the Department of Automobile Engineering, Vel Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engine**. This is a bonafide work carried out at **Escorts Agri-Machinery Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"SCR System Development for 6.7 Liter Heavy Duty Engine"** is submitted by **ROHIT KUMAR YADAV** bearing registration Number **15PEIC4016** to the School of Mechanical and Construction Engineering of the Veltech Dr.RR & Dr.SR University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Master of Technology in Internal Combustion Engines.** This is a bonafide work carried out at **FEV India Pvt Ltd, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Improving the Quality of the Fault Diagnostics by Guided Troubleshooting and To Reduce Serviceability Time on HCV Platform"** is submitted by **ANDHAVARAPU SIVA** bearing registration Number **15PEAE4001** to the Department of Automobile Engineering of the VelTech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Automotive Electronics and Embedded Systems**. This is a bonafide work carried out at **Devise Electronics Private Limited, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**DESIGN AND DEVELOPMENT OF A PROTOTYPE FOR LOW COST INTEGRATED MODULE FOR RPAS, OVERSPEED WARNING SYSTEM AND SEAT BELT DETECTION.**" is submitted by **PATIL PRITAM ARUN** bearing registration Number **15PEAE4004** to the Department of Automobile Engineering of the Vel tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Automotive Electronics and Embedded systems.** This is a bonafide work carried out at **SPARK MINDA TECHNICAL CENTRE, MINDA CORPORATION** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"DESIGN AND DEVELOPMENT OF CONTAINERIZED ENGINE TEST FACILITY"** is submitted by **Anoop Krishna S** bearing registration number **15PEIC4001** to the School of Automotive engineering of the Vel-Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in IC engine**. This is a bonafide work carried out at **ARAI - Kothrud** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that dissertation work titled "**Design and Development of Accurate and Reliable Oil Consumption Measurement Method in Test Cell**" is submitted by **ANUJA DESHPANDE** bearing registration number **15PEIC4002** to the department of Automobile Engineering of the Veltech University and ARAI Academy, The Automotive Research Association of India, Pune in the partial fulfilment of the requirement for the degree of **Master of Technology in Internal Combustion Engines.** This is bonafide work carried out at **Product Engineering Department, Tata Cummins Private Ltd, Jamshedpur** by her under our supervision. The contents of this dissertation in full or parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Performance Analysis and Improvement of a 3.77L Turbocharged CNG Engine using 1D Simulation Tool and Experimental Co Relation**" is submitted by **Ayush Srivastava** bearing registration Number **15PEIC4003** to the Department of Automobile Engineering of the Veltech Dr RR & Dr SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **VE Commercial Vehicles Ltd.** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Optimization Of Closed Loop Lambda Controller To Improve The Conversion Efficiency Of 3-Way Catalytic Converter In Four Stroke Single Cylinder Engine**" is submitted by **K.JAGAN** bearing registration Number **15PEIC4005** to the School of Mechanical and Construction Engineering of the Vel Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **TVS Motor Company LTD, Hosur** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Improving the Fuel Economy of Ground vehicle by Reducing Aerodynamic Drag"** is submitted by **JAGDEO SIDDHARTH MADHUKAR** bearing registration Number **15PEIC4006** to the School of Mechanical and Construction Engineering of the Veltech Dr.RR & Dr.SR University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Veltech Dr.RR & Dr.SR University, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Experimental Investigation on the Effect of Injection Pressure on Performance and Emissions of Diesel Engine when operated with Datura Stramonium at Different Blends**" is submitted by **Kanchi Sasi Kumar** bearing registration Number **15PEIC4007** to the School of Mechanical and Construction Engineering of the VELTECH Dr. RR & Dr.SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Master of Technology in Internal Combustion Engines. This is a bonafide work carried out at **VelTech Dr. Rr & Dr.Sr Technical University, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**NUMERICAL INVESTIGATION OF PERFORMANCE AND EMISSION CHARACTERISTICS OF HYDROUS ETHANOL (HE) IN SI ENGINE**" is submitted by PADMASINH NETAJI BIRAJDAR bearing registration Number 15PEIC4011 to the Department of Automobile Engineering of the Vel-tech Dr. RR & Dr. SR Technical University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Masters of Technology in Internal Combustion Engines. This is a bonafide work carried out at College of Military Engineering, Pune by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled " **Effect of In-Cylinder Injection Strategies and Spark Characteristics on Performance and Emissions of Gasoline Direct Injection (GDI) Engine Using Simulation Tool** " is submitted by **Patel Kamlesh Hirji** bearing registration Number **15PEIC4012** to the School of Automobile Engineering of the Dr. RR & Dr. SR Technical University, Veltech and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **"ARAI Academy, Pune."** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled **"ATTENUATION OF AEROACOUSTIC NOISE OF A TYPICAL VAN USING PASSIVE DEVICES THROUGH CFD SIMULATION"** is submitted by **MANIKANDAN.M.P** bearing registration Number **16PEIC4009** to the School of Automobile Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is the bonafide work carried out at **Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled **"Analysis of In-cylinder Combustion Characteristics and Estimation of Burn Rate for 1-D Simulation"** is submitted by **"Mayur Manohar Patne"** bearing registration number **16PEIC4010** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in Internal Combustion Engine**. This is the bonafide of the work carried out at **"MTU India Pvt Ltd. (EARC) Pune."** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Optimization of cooling system (Radiator, CAC and Condenser) performance of a tractor through CFD"** is submitted by **"Naresh M"** bearing registration number **16PEIC4011** to the School of Automobile Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science & Tehnology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is the bonafide of the work carried out at **"TAFE, Chennai"** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled **"STUDY OF BENDING MOMENT ON SIX CYLINDER ENGINE CRANKSHAFT WITH ADDITIONAL FRONT END POWER TAKE OFF"** is submitted by **NILAVAN M** bearing registration Number **16PEIC4012** to the Department of Automobile Engineering of the Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Ashok Leyland Technical Centre, Velivoyalchavadi, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled "**The Effect of Pilot and Main Injection Strategies on Performance and Emissions when Operated with Palm Munja Biodiesel and HHO Gas**" is submitted by **Nirmal Kumar Ravi** bearing registration Number **16PEIC4013** to the Department of Automobile Engineering, School of Mechanical and Construction of Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy. The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Master of Technology in Internal Combustion Engines. This is a bonafide work carried out at **Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other Institute or University for the award of any degree.

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This is to certify that the dissertation work titled **"Design and Development of Exhaust After Treatment System with Common Rail Direct Injection for 15.2 L Diesel engine to achieve BS-IV(CEV) emission norms at NRSC condition"** is submitted by **"Prashanna Balaji J M"** bearing registration number **16PEIC4014** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in INTERNAL COMBUSTION ENGINES**. This is the bonafide of the work carried out at **"BEML, Engine D&D"** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Study of Different Transient Combustion Modelling Approaches in 1D Simulation for Diesel Genset Engine"** is submitted by **"Praveen Kumar R"** bearing registration number **16PEIC4015** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in Internal Combustion Engines**. This is the bonafide of the work carried out at **"MTU India Pvt Ltd. (EARC) Pune."** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Improvement of cylinder liner life for Diesel Engines"** is submitted by **B.Rajiv Sasank** bearing registration number **16PEIC4016** to the School of Mechanical & Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and technology , Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal combustion Engines**. This is the bonafide of the work carried out at **Ashok Leyland Technical Centre** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Design and Development of Cooling System by Numerical Simulation using 3D CFD Software and Experimental Analysis for a Three Wheeler CNG Engine."** is submitted by **Gujjala Bala Manikya Tulasi Rakesh** bearing registration Number **16PEIC4017** to the School of Automobile Engineering of the Dr. RR & Dr. SR Technical University, Veltech and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfillment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **ARAI** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Design and Development of Selective Catalytic Reduction Ad-Blue Mixer for BS VI emissions Norms**" is submitted by **Pathan Rehaman Khan** bearing registration Number **16PEIC4018** to the Department of Automobile Engineering, School of Mechanical and Building Sciences of the **Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology,** Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Tenneco Automotive India Pvt Ltd** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Improvement of BTE by Injection Rate Shapes in Advanced CI Engine"** is submitted by **"Gaikar Shreyas Sanjay"** bearing registration number **16PEIC4020** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in INTERNAL COMBUSTION ENGINES**. This is the bonafide of the work carried out at **"ARAI Academy, Pune"** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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Date of Submission: 6/6/18

CERTIFICATE

This is to certify that the dissertation work titled "**The Effect Of Injection Pressure When Engine Runs With Palm Munja Bio Diesel And HHO Gas Introduction.**" is submitted by **D R Vigneshwar** bearing registration Number (**16PEIC4021**) to the School of Mechanical and Construction Engineering of the VELTECH RANGARAJAN Dr.SAGUNTHALA R&D INSTITUTE OF SCIENCE AND TECHNOLOGY, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Master of Technology in Internal Combustion Engines. This is a bonafide work carried out at **VELTECH RANGARAJAN Dr.SAGUNTHALA R&D INSTITUTE OF SCIENCE AND TECHNOLOGY, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled **"Study of Effects of Charge Induction Strategies On Performance and Emissions of Hydrogen-Diesel Fueled Engine Using Experimentation and Simulation Tools"** is submitted by **"Vijayagopi R"** bearing registration number **16PEIC4022** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Masters of Technology in INTERNAL COMBUSTION ENGINES**. This is the bonafide of the work carried out at **"Renewable Fuels and Internal Combustion Engines Lab, IIT-Mandi."** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Experimental and Numerical Prediction of Pressure Drop Reduction of Catalytic Converter Under Various Mass Flow rate of Exhaust Gas for a naturally Aspirated Diesel Engine**" is submitted by **Vinodh Kumar KG** bearing registration Number **16PEIC4024** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan & Dr.Sagunthala R&D Institute of Science & Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Vel Tech Rangarajan & Dr.Sagunthala R&D Institute of Science & Technology**, Chennai by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Numerical Heat Transfer Analysis & Development Of A Heat Removal System For An Unshaded Parked Car In Sunny Day-CFD Study.**" is submitted by **Vishal Shankar Rath** bearing registration Number **16PEIC4025** to the School of Automobile Engineering of the Vel Tech Rangarajan & Dr. Sagunthala R&D Institute of Science & Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Vel Tech Rangarajan & Dr. Sagunthala R&D Institute of Science & Technology** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**OPTIMIZATION OF INJECTION PRESURE TO IMPROVE ENGINE PERFORMANCE &EMISSIONS WITH PALM MUNJA BIODIESEL**" is submitted by **Ambati Ramesh Reddy** bearing registration Number **16PEIC4029** to the Department of AutomobileEngineering, School of Mechanical and Construction Engineering of the **Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology**, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of Master of Technology in Internal Combustion Engines. This is a bonafide work carried out at **Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled "**Design and Thermostructural Analysis of Exhaust Manifold for a Modern CRDi Diesel Engine**" is submitted by **Jaison Jacob T** bearing registration Number **16PEIC4031** to the School of Mechanical and Construction of the Vel Tech University, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in IC Engines**. This is a bonafide work carried out at **Force Motors ltd. Pune,** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled "**Design, Development &Integration of Mounting and Fixtures for different component used in conversion of Internal Combustion Engine Vehicle to Hybrid Electric Vehicle**" is submitted by **Saroj Kumar Barik** bearing registration number **16PEIC4032** to the School of Mechanical and Construction of the VEL TECH University, Avadi and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Internal Combustion Engine.** This is a bonafide work carried out at **ARAI, Pune** by him under our supervision. The contents of this dissertation in full or in parts have not been submitted to any other institute or university for the reward of any degree.

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This is to certify that the dissertation work titled **"DEVELOPMENT AND ANALYSIS OF TWO WHEELER IGNITION SYSTEM ON EMI PERFORMANCE"** is submitted by **GOKUL M** bearing registration Number **16PEAE4003** to the School of Electrical of the Vel-Tech Rangarajan Dr Sangunthala R&D Institute of science and technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Master of Technology in Electronics Engineering (Automotive Electronics)**. This is a bonafide work carried out at **Automotive Research Association of India, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled **"Development Of H-Bridge for Throttle Control Driver With Variable Frequency of PWM Signal For Thermal Management of BSVI Engines"** is submitted by **MOHAMED IRFANUDDIN** bearing registration Number **16PEAE4005** to the School of Mechanical of the Vel-Tech Rangarajan Dr.Sangunthala R&D Institute of Science and Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfillment of the requirements for the degree of **Master of Technology in Electronic Engineering Specialization in Automotive Electronics**. This is a bonafide work carried out at **Automotive Research Association of India, Pune** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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CERTIFICATE

This is to certify that the dissertation work titled " **A STUDY OF VIBRATION ISOLATION OF ENGINE MOUNTING SYSTEM OF VIKRAM 750 D VEHICLE WITH EXISTING RUBBER BUFFER ENGINE MOUNTING AND WITH PROPOSED HYDRA STATIC MOUNTING**" is submitted by **ANURAG SINGH** bearing registration Number **16PEIC4001** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science & Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at SCOOTERS INDIA LIMITED, LUCKNOW (U.P) by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled " **ELIMNATION OF SEIZURE OF A 2-WHEELER ENGINE** " is submitted by **Arun S Varma** bearing registration Number **16PEIC4002** to the School of Automobile Engineering of the Dr. RR & Dr. SR Technical University, Veltech and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **ARAI** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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This is to certify that the dissertation work titled " **Design And Development Of Exhaust Muffler For A Naturally Aspirated Diesel Engine** " is submitted by **Dalal Premanshu Santosh** bearing registration Number **16PEIC4003** to the School of Mechanical and Construction Engineering of the Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science & Technology, Chennai and ARAI Academy, The Automotive Research Association of India, Pune in partial fulfilment of the requirements for the degree of **Master of Technology in Internal Combustion Engines**. This is a bonafide work carried out at **Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science & Technology** by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

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