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

DEPARTMENT OF MECHANICAL ENGINEERING

PRESENTS

VULCAN

(2019-2020)

"Vulcan is the Roman and Greek god of fire and the forge, and mythical inventor of smithing and metal working"

IN ASSOCIATION WITH

MESA
MECHANICAL ENGINEERING
STUDENTS ASSOCIATION

Department of Mechanical Engineering

Vision

To be a Centre of Excellence for education and research in the field of Mechanical Engineering to meet the national as well as global challenges.

Mission

M1: To educate and enrich effective and responsible engineers for national as well as global requirements by providing quality education.
M2: To maintain vital State-of-the-Art Research facilities to provide its students and faculty with opportunities to create, interpret, apply and disseminate knowledge.
M3: To develop linkages with world-class organizations and educational institutions in India and abroad for excellence in teaching, industry and research.
M4: To cultivate and promote entrepreneurship using the industry and R&D facilities of the institution.

Program Educational Objectives (PEOs)

PEO1: Apply modern analytical, computational, simulation tools and techniques on engineering materials, thermal sciences, applied mechanics and manufacturing methods to address the global challenges faced in mechanical and allied engineering streams.
PEO2: Adapt new and recent techniques of engineering science and their applications to conceive, organize and develop the design of engineering systems.
PEO3: Work as an individual and in teams on multidisciplinary assignments in industries, research organizations and academic institutions both at national and global levels through collaboration.
PEO4: Demonstrate techno-commercial skills such as research interest and entrepreneurial ability in students to cater the societal problems.

Program Outcomes (POs)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

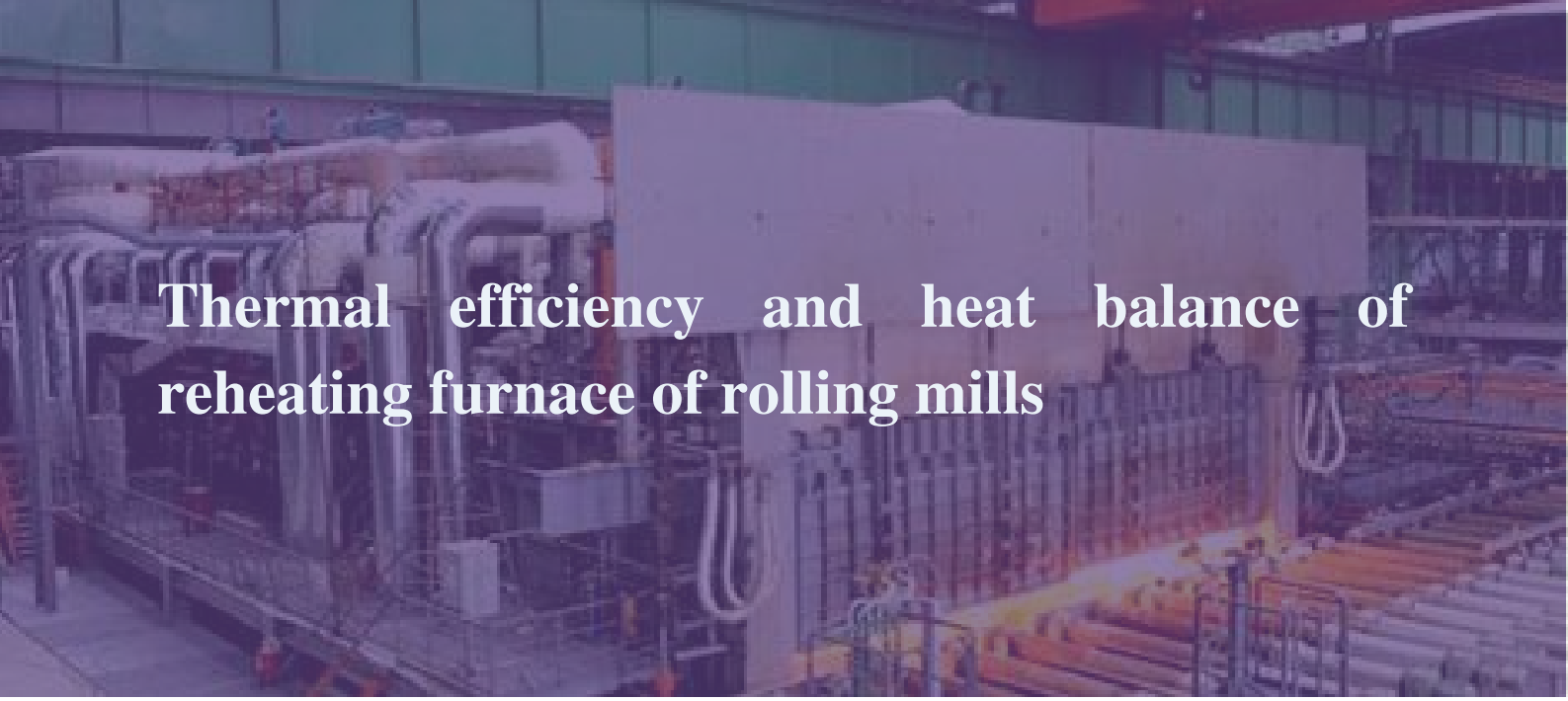
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (POs)

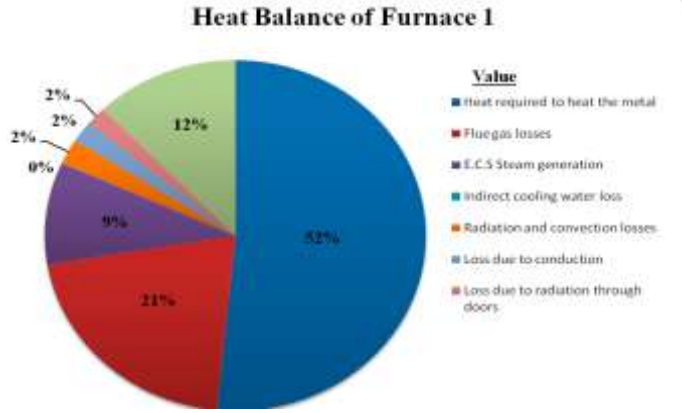
PSO1: Apply their knowledge in the domains of design, manufacturing and thermal sciences to solve engineering problems using advanced technology.

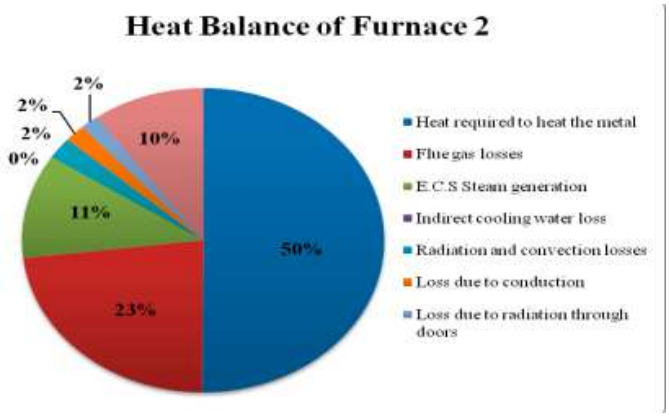
PSO2: Engage professionally in industries or as entrepreneurs by applying innovative ideas in design and manufacturing using modern CAD/CAE/CAM tools.



Thermal efficiency and heat balance of reheating furnace of rolling mills

Along with the consolidation of traditional renewable energies such as wind or photovoltaic, we are also witnThermal efficiency and heat balance of reheating furnace of rolling millsessing the advent of a new generation of renewable energies. Some of them, such as wave energy, will take advantage of the seas' energy potential. Others will make it possible to obtain electricity from the ubiquitous Wi-Fi signals. Or even by resorting to the so-called shadow effect. We also address the use of triboelectricity in applications as diverse as wildfire prevention.

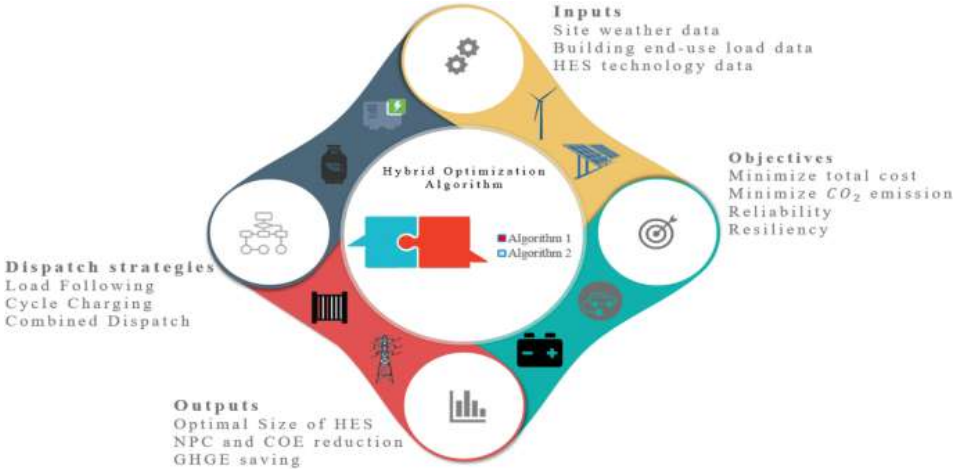




Anand P
Mechanical Department

Design of cellular manufacturing system for power press industry to reduce total travelling time by hybrid algorithm

Part family identification and machine cell formation are the two major steps in cellular manufacturing system. Cell formation is a complex process and there are several approaches for this purpose vis., array based clustering, agglomerative clustering, mathematical programming, graph partitioning and non-traditional methods. The problem with first two approaches is that the quality of the solution is dependent of the initial part machine incidence matrix. A new algorithm for cell formation combining the techniques of array based clustering and agglomerative clustering is proposed. The above proposed method is tested by using standard problems and compared with other method results for the same standard problems. Grouping efficiency is the most widely used measures of quality for cellular manufacturing systems. The proposed algorithm is used to form manufacturing cells in a power press industry to increase productivity by reducing total travelling time.



Anand P
Mechanical Department

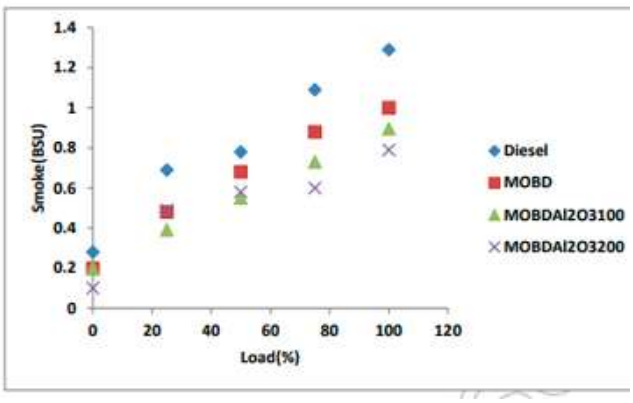
Experimental investigation on the effect of photovoltaic panel partially and fully submerged in water

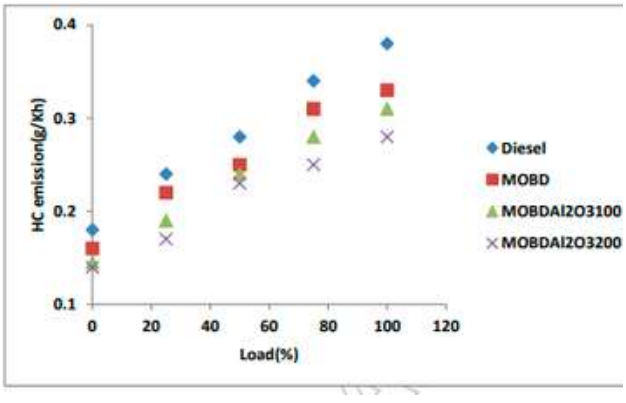
This study presents an experimental analysis of improving the thermal, electrical efficiency, and yield of a conventional solar still (CSS). The photovoltaic (PV) efficiency decreases with increase in water depth inside the basin while the still efficiency is higher in the case of fully submerged condition. The maximum water production was about 8 kg/m2 /day with PV under fully submerged condition; and during off-shine hours the still efficiency was higher when compared with the partially submerged condition. Similarly, with a decrease in water temperature the panel efficiency is increases. The maximum hourly water production with and without the PV was found to be 1.3 and 0.45 kg/m2 , respectively. The main outcome of this study is that this mechanism can be used in isolated locations where there is a scarcity of current and distilled water.

Madhu B., Balasubramanian E
Mechanical Department

Investigation on emission pattern of biodiesel and Nano-particles

This work investigates the detailed study on emission characteristics of Compression Ignition Engine (single cylinder, four-stroke Direct Injection) fuelled with diesel, Mustard oil biodiesel (MOBD) and Aluminum oxide nanoparticle (Al2O3). Adding a nanoparticle with biodiesel (MOBD Al2O3100) revealed a decrease in HC and CO emission by 2.2 and 4.3% respectively when compared with neat MOBD at all loads conditions. Smoke and NOx emissions were decreased by 3.4 and 4.8 respectively due to rapid evaporation of air-fuel mixtures resulting shorten ignition delay period.

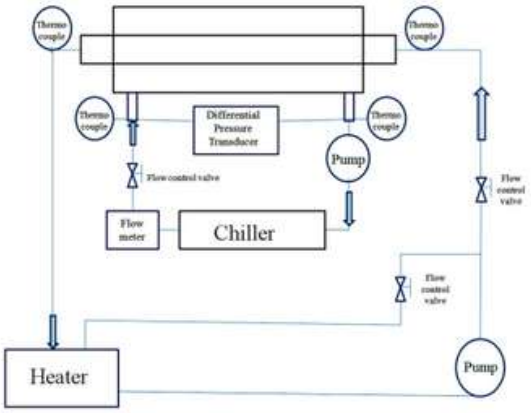


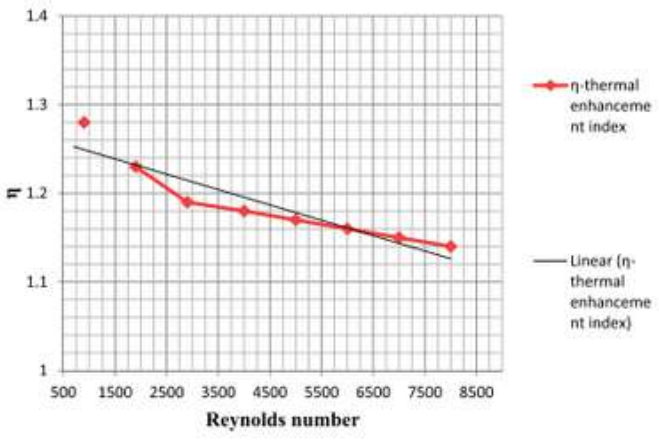


Devaraj A., Vinoth Kanna I.
Mechanical Department

Experimental investigation on the effect of shell side interstitial twisted tapes in the performance of counter flow shell and tube heat exchanger

Identically similar-sized counter flow shell-and-tube exchanger with single segmental baffles and shelland-tube heat exchanger with four interstitial twisted tapes were tested with Propylene Glycol (PG) solution. Water was mixed with various amounts of Propylene glycol (0%, 20%, 30% and 40% by volume) under same operating temperature conditions. The corresponding results from these shell and tube heat exchangers were then compared. The shell and tube heat exchanger with four interstitial twisted tapes produces improved thermal enhancement index for the complete range of fluid concentrations.

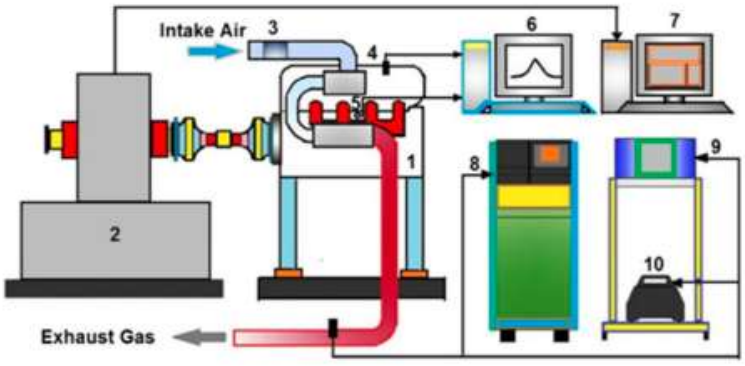




N. Dilip Raja
Mechanical Department

Effect of ethanol fumigation on CNSL oil and diesel blends

In this work, preheated CNSL oil and diesel blends with ethanol fumigation were tested for a one cylinder Compression ignition engine to investigate of engine efficiency and emission level under different load conditions at constant speed. First this experiment was conducted for preheated CNSL oil of different temperature like 70 C, 80 C and 90 C. The optimized preheated temperature of 80 C was chosen as based on engine performance and emissions. The various blends are [(Preheated CNSL20+D80) +E fumigation], [(Preheated CNSL40+D60) +E fumigation], [(Preheated CNSL60+D40) +E fumigation), (Preheated CNSL80+D20) +E fumigation], [(Preheated CNSL100) +E fumigation] were tested in the engine at optimized temperature (80 C). The results are compared with pure diesel fuel. The engine efficiency and emissions is improved in the blends of [(preheated CNSL20+D80) +E fumigation] at optimized temperature.

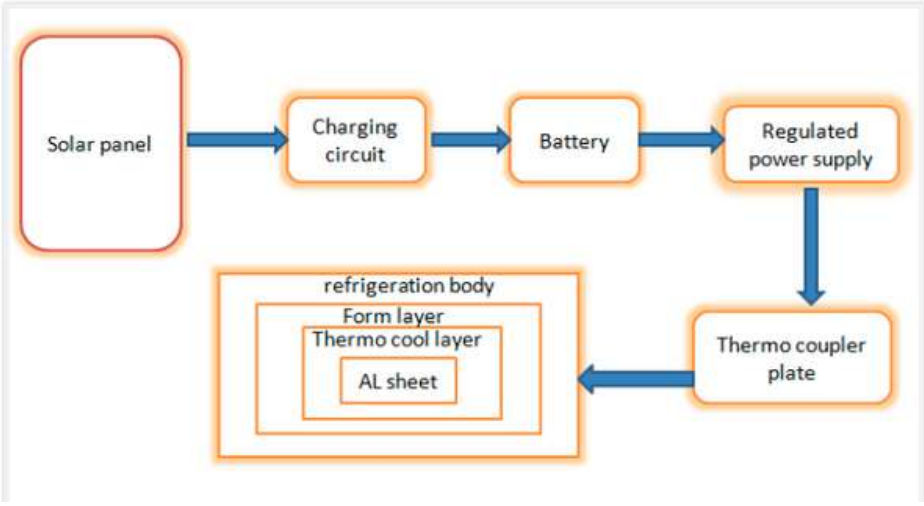


1. Test engine
2. Eddy current dynamometer
3. Air mass sensor
4. Pressure sensor
5. Accelerometer
6. Data aquisition system (DAS)
7. Dynamometer controller
8. Bosch gas analyser
9. AVL digas analyser
10. Smoke opacity meter

Logesh, K
Mechanical Department

Solar Based Refrigerator

As the trend changes the consumption of electricity also increases, to reduce this we can use renewable sources such as solar energy which is world's most rich, stable and clean source of energy having large potential and also we see that in present refrigerator system which produce cooling effect by refrigerants like CFC's, HCFC's, Freon, ammonia which gives a maximum efficiency but the main disadvantage is that it causes the global warming ozone depletion. Now this problem can be overcome by Peltier effect and thereby protecting the environment. In this paper to introduce the portable refrigerator using peltier module with solar energy as supply which overcomes the disadvantages of existing refrigerator with increase in population and environment degradation there is an alarming rate for thermoelectric couple system have come to rescue as these are environmental friendly, affordable and compact in size.

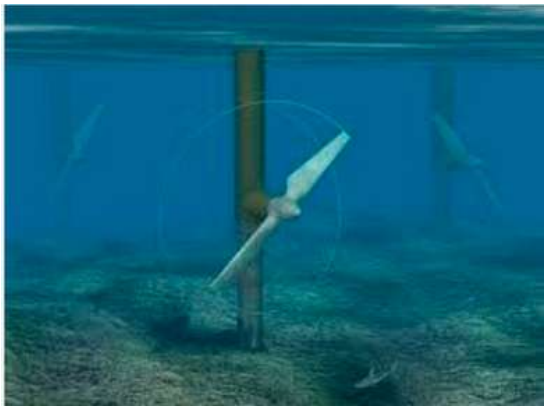


K. Venkata Sudheer
1st year, Mechanical Department

Underwater Windmill

This Idea should be somewhat obvious in hindsight. We build ordinary windmills to extract useful power from wind energy. We put turbines in rivers (usually accompanied by dams) to extract useful power from downhill water flow. The second is more "energy intensive" than the first, which is why we all know that dams are great sources of electrical power, while electric-generator windmills spent decades in the economic doldrums (return on investment -- ROI-- is relatively tiny, and only recently proved viable on a large scale).Anyway, putting the equivalent of a windmill in a steady ocean current, say the Gulf Stream, should have an automatically-viable ROI that is intermediate between windmills and ordinary hydropower. This is because water is something like a thousand times denser than air, so a volume of flowing water contains a thousand times the energy of an equal volume of equally-flowing air.

Do note that the ocean has different currents at different depths. I once read somewhere that near the seafloor underneath the Gulf Stream is another current going the opposite direction. If true, then we can build towers on the seafloor, just like ordinary windmills, to extract power.



K. Akash Kumar singh (Vtu11252)
2nd year, Mechanical Department

Wireless Solar Mobile Charger

This becomes very inconvenient for people on the road or occupied with work. In order to recharge the phone, people must bring wall phone chargers. The newest technology of solar phone chargers is a separate device that uses a small solar panel to absorb light and then transfer to the phone. This process still forces customers to carry around another device along with their cell phones.

Our project goal is to develop a miniature solar panel to be installed onto the cell phone itself. This way, the phone can charge independently; independent of power outlets and independent of wires. There won't be any need for electrical outlets or portable solar panels. The mobile phone will be able to charge anywhere outside or where it is exposed to sun light. A miniature solar cell will be built into the phone and able to absorb enough sunlight to charge the device while in use.

M. Shiva Shankar (VTU11276)
2nd year, Mechanical Department

A metal forest by Silicon Kingdom Holdings

A forest of 1,200 mechanical "trees," designed by Silicon Kingdom Holdings and Arizona State University scientists, is poised to pull more carbon dioxide out of the air than any human-made endeavor before it. Instead of wood, these metal columns (the specific material remains under wraps) use discs made of sorbent, which can absorb three times its weight in carbon dioxide as the wind blows through it. A cluster of 12 can suck a metric ton of the gas out of the atmosphere every day; a full lot, like the pilot one SKH is planning to install in California, can remove up to 36,500 metric tons annually. That's nearly 1,844 American households' worth of emissions.

Manoj Kumar (VTU11379)
2nd year, Mechanical Department