SARASWATI Education Society's

SARASWATI Institute of Technology

Learn Live Achieve and Contribute

Kharghar, Navi Mumbai - 410 210.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

"To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs".

MISSION

- *To educate, guide, and mentor the students for academic excellence*
- *To develop technical skills and discipline among the students as per the requirement of the industry.*
- *To impart ethics & social values by arranging social activities.*

Subject Name: Thermal Engineering (313310) **Date :-**

Assignment No :- 1 **Course Outcome: 303.1**

Topic Name :- Fundamentals of Thermodynamics

---

1. Differentiate between open, closed, and isolated systems with suitable examples.
2. Explain the concepts of extensive and intensive properties. Provide examples of each type of property.
3. Define work and heat from a thermodynamic perspective. How do they differ from each other?
4. State and explain the Zeroth Law of Thermodynamics.
5. State the First Law of Thermodynamics.
6. State the Second Law of Thermodynamics in both Kelvin-Planck and Clausius statements.
7. Differentiate between a heat engine, heat pump, and refrigerator.
8. What is the Steady Flow Energy Equation (SFEE)? Apply it to the boiler, turbine, and condenser.

Date of Submission :-

Assign By :- Mr. Rahul Gondhali

SARASWATI Education Society's

SARASWATI Institute of Technology

Learn Live Achieve and Contribute

Kharghar, Navi Mumbai - 410 210.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

"To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs".

MISSION

- *To educate, guide, and mentor the students for academic excellence*
- *To develop technical skills and discipline among the students as per the requirement of the industry.*
- *To impart ethics & social values by arranging social activities.*

Subject Name: Thermal Engineering (313310) **Date :-**

Assignment No :- 2 **Course Outcome: 303.2**

Topic Name :- Ideal Gases and Steam Fundamentals

---

1. Explain the following ideal gas processes: isobaric, isochoric, isothermal, isentropic, and polytropic. also draw on P-V and T-S diagrams
2. Explain wet, dry, and superheated steam.
3. Define sensible heat, latent heat, total heat, specific volume, and dryness fraction.
4. Draw a neat sketch of the Rankine cycle on P-V and T-S diagrams and explain the processes involved in the Rankine cycle.
5. A gas occupies a volume of 2 liters at a pressure of 3 atm. It is heated at constant pressure until the volume becomes 4 liters. Calculate the work done by the gas.
6. A gas occupies a volume of 5 liters at a pressure of 4 atm. It undergoes an isothermal expansion until the pressure becomes 2 atm. Calculate the final volume.

Date of Submission :-

Assign By :- Mr. Rahul Gondhali

SARASWATI Education Society's

SARASWATI Institute of Technology

Learn Live Achieve and Contribute

Kharghar, Navi Mumbai - 410 210.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

"To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs".

MISSION

- *To educate, guide, and mentor the students for academic excellence*
- *To develop technical skills and discipline among the students as per the requirement of the industry.*
- *To impart ethics & social values by arranging social activities.*

Subject Name: Thermal Engineering (313310) **Date :-**

Assignment No :- 3 **Course Outcome: 303.3**

Topic Name :- Components of Steam Power Plant

---

1. Define a steam power plant and explain its basic components with a neat diagram.
2. What is the role of a steam boiler in a steam power plant? Briefly describe the different types of boilers used in power plants.
3. Explain the construction and working of Lamont boiler and Benson boiler with a suitable diagram.
4. Explain the function and types of steam nozzles used in steam power plants.
5. Explain the need for compounding in steam turbines and discuss different methods of compounding
6. State Dalton's law of partial pressure and explain its significance in the context of steam condensers.
7. Explain the construction and working of a natural draft cooling tower with a suitable diagram. Discuss the advantages and disadvantages of natural draft cooling towers.

Date of Submission :-

Assign By :- Mr. Rahul Gondhali

SARASWATI Education Society's
SARASWATI Institute of Technology
Learn Live Achieve and Contribute
Kharghar, Navi Mumbai - 410 210.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

"To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs".

MISSION

- *To educate, guide, and mentor the students for academic excellence*
- *To develop technical skills and discipline among the students as per the requirement of the industry.*
- *To impart ethics & social values by arranging social activities.*

Subject Name: Thermal Engineering (313310) **Date :-**

Assignment No :- 4 **Course Outcome: 303.4**

Topic Name :- Heat Transfer & Heat Exchangers

---

1. Define the three modes of heat transfer: conduction, convection, and radiation. Provide examples of each mode in everyday life.
2. Define absorptivity, transmissivity, reflectivity, and emissivity in the context of radiation heat transfer. Explain the concept of a black body and a gray body.
3. Explain the construction and working of a shell-and-tube heat exchanger. Discuss its applications in various industries.
4. Describe the construction and working of a plate-type heat exchanger. Compare its advantages and disadvantages with shell-and-tube heat exchangers.
5. A composite wall consists of two layers: a 10 cm thick layer of brick with a thermal conductivity of 0.8 W/mK and a 5 cm thick layer of insulation with a thermal conductivity of 0.04 W/mK. The temperature difference between the inner and outer surfaces of the wall is 60°C. Calculate the rate of heat flow per unit area through the wall.

Date of Submission :-

Assign By :- Mr. Rahul Gondhali

SARASWATI Education Society's

SARASWATI Institute of Technology

Learn Live Achieve and Contribute

Kharghar, Navi Mumbai - 410 210.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

"To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs".

MISSION

- *To educate, guide, and mentor the students for academic excellence*
- *To develop technical skills and discipline among the students as per the requirement of the industry.*
- *To impart ethics & social values by arranging social activities.*

Subject Name: Thermal Engineering (313310) **Date :-**

Assignment No :- 5 **Course Outcome: 303.5**

Topic Name :- Introduction to I.C. Engine & Power Cycles

---

1. Describe the Carnot cycle and its significance in thermodynamics. Represent the Carnot cycle on a P-V and T-S diagram.
2. Explain the Otto cycle and its applications in internal combustion engines. Represent the Otto cycle on a P-V and T-S diagram.
3. Differentiate between the Diesel cycle and the Otto cycle.
4. Define the following terms related to internal combustion engines: bore, stroke, compression ratio, mean effective pressure, and indicated thermal efficiency.
5. Compare two-stroke and four-stroke internal combustion engines. Explain their construction and working principles.
6. Classify internal combustion engines based on their fuel type, ignition system, and number of strokes. Provide examples of each type.

Date of Submission :-

Assign By :- Mr. Rahul Gondhali