

Th-4 Thermal Engineering-I

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer All questions 2 x 10
 - a. What do you understand by an ideal gas?
 - b. Define thermodynamics.
 - c. Classify IC engines according to the type of fuel used.
 - d. What is the significance of octane number in IC engine fuels?
 - e. Differentiate between intensive and extensive properties.
 - f. Define the calorific value of fuel.
 - g. Define a Heat Engine.
 - h. What is meant by compression ratio in an IC engine?
 - i. State the Zeroth Law of thermodynamics.
 - j. Define thermal efficiency.

2. Answer Any Six Questions 6 x 5
 - a. Explain Carnot Cycle.
 - b. In a heat engine, the temperature of the source and sink are 650°C and 60°C respectively. The heat supplied is 4.5 MJ/min. Find the power developed by the engine.
 - c. Differentiate between Octane number and Cetane number.
 - d. Discuss about the limitations of First Law of Thermodynamics.
 - e. Explain the working of a four stroke engine.
 - f. Prove $C_p - C_v = R$.
 - g. Explain the quasi-static process.

3. Explain the diesel cycle with the help of p-V and T-S diagram and derive an expression for the ideal efficiency of a diesel cycle. 10

4. An engine uses 6 kg of fuel per hour of calorific value 41000 kJ/kg. If I.P. of the engine is 21 kW and mechanical efficiency is 82%. Calculate, i) indicated thermal efficiency, ii) brake specific fuel consumption and iii) Brake thermal efficiency. 10

5. Discuss in the detail about Point function & Path function. Differentiate between them. 10

6. Compare a SI engine with a CI engine. 10
7. Show the equivalence of two statements of 2nd Law of thermodynamics. 10