CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   **18ME15/25**

First/Second Semester B.E. Degree Examination, June/July 2023
Elements of Mechanical Engineering

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of steam tables is permitted.

Module-1

1 a. Define the term fuel. Write a note on solid fuels. (06 Marks)
   b. With the help of neat diagram, explain the construction and working nuclear power plant. (08 Marks)
   c. Write notes on the following: (i) Ozone depletion   (ii) Global warming (06 Marks)

OR

2 a. Define the term thermodynamics. State first and second law of thermodynamics. (06 Marks)
   b. With the help of a Temperature-Enthalpy (T-h) diagram, explain the formation of steam at a constant pressure. (06 Marks)
   c. 5 kg of wet steam of dryness 0.8 passes from a boiler to a super heater at a constant pressure of 1 MPa abclute. In the superheater its temperature increases to 350°C. Determine the amount of heat supplied in the superheater. The specific heat of superheated steam C_{ps} = 2.25 kJ/kgK. (08 Marks)

Module-2

3 a. Define the term boiler. Classify the boilers. (06 Marks)
   b. With the help of a neat sketch, explain the construction and working of a Babcock and Wilcox boiler. Indicate clearly flow of flue gases. (10 Marks)
   c. List the boiler mountings. (04 Marks)

OR

4 a. Define the term prime mover. Explain the principle of working of impulse and reaction turbine. (06 Marks)
   b. With the help of neat sketch, explain the construction and working of Francis turbine. (08 Marks)
   c. What is meant by cavitation and priming? (06 Marks)

Module-3

5 a. Define the term Internal Combustion Engine. Classify the Internal Combustion Engine. (06 Marks)
   b. With the help of PV diagram, explain the working of four stroke diesel engine. (08 Marks)
   c. Explain the desirable properties of an ideal refrigerant. (06 Marks)

OR

6 a. Explain the working of a vapour absorption refrigeration system with neat sketch. (07 Marks)
   b. The following readings were taken on a four stroke I.C. engine:
       Diameter of the brake drum = 1.5 m   Diameter of the rope = 10 mm
       Load suspended on the brake drum = 100 kg   Spring balance reading = 5 kg
       Crankshaft speed = 200 rpm
       Determine the brake power of the engine. (07 Marks)
   c. With the help of neat sketch, explain the working of room air conditioner. (06 Marks)

Module-4

7 a. What are the properties of cast iron and aluminium? (08 Marks)
   b. Differentiate between welding, brazing and soldering. (06 Marks)
   c. Write a note on smart materials. (06 Marks)

OR

8 a. With the help of neat sketch, explain Tungsten Inert Gas (TIG) Welding. (06 Marks)
   b. Obtain an expression for the ratio of tensions in case of flat belt. (07 Marks)
   c. List the advantages and disadvantages of gear drives over belt drives. (07 Marks)

Module-5

9 a. With neat sketch, highlight the specification of lathe. (06 Marks)
   b. With the help of neat sketch, explain taper turning by tailstock set over method. (06 Marks)
   c. Explain briefly, with the help of neat sketches, following operations:
      (i) Straddle milling   (ii) Gang milling
      (iii) Slab milling   (iv) Angular milling   (08 Marks)

OR

10 a. Define the term Computer Numerical Control (CNC). Explain the basic components of CNC. (06 Marks)
   b. Define the term manipulator. Briefly explain the five type of joints that are used in industrial robot construction. (08 Marks)
   c. List the industrial robot application in the processing operations. (06 Marks)

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