CBCS SCHEME

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18ME15/25

First/Second Semester B.E. Degree Examination, Jan./Feb. 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. Explain briefly the principle of working of Nuclear Power plant. **(08 Marks)**

b. The enthalpy of 1kg of steam of 70 bar is 2680 kJ. What is the condition of steam? **(04 Marks)**

c. Explain the following terms in relation to steam : i) Sensible Heat ii) Latest Heat iii) Enthalpy of steam iv) Dryness fraction. **(08 Marks)**

OR

2 a. Briefly explain the Formulation of steam with Temperature – Enthalpy diagram. **(08 Marks)**

b. Explain with a neat sketch the working of Wind mill. **(08 Marks)**

c. Differentiate between Bio Fuels and Petroleum Fuels. **(04 Marks)**

Module-2

3 a. Differentiate between Fire Tube Boiler and Water Tube Boiler. **(04 Marks)**

b. Briefly explain the working principle of Pelton wheel turbine, with a neat sketch. **(08 Marks)**

c. List the various Boiler mounting and Accessories and mention its usage. **(08 Marks)**

OR

4 a. Explain the construction and working of Lancashire Boiler, with a neat sketch. **(10 Marks)**

b. How pumps are classified? With a neat sketch, explain the working of Centrifugal pump. **(10 Marks)**

Module-3

5 a. Give the classification of IC Engines. **(04 Marks)**

b. Briefly explain the working of Room Air Conditioner. **(08 Marks)**

c. Define the following terms : i) Ton of Refrigeration ii) COP iii) Ice making effect iv) Air conditioner. **(08 Marks)**

OR

6 a. Explain the construction and working of a 2 stroke SI engine with neat sketch. **(10 Marks)**

b. A single cylinder 4 – stroke IC engine has the following details :
Bore - 180mm ; Stroke – 200mm ; Rated speed – 300 rpm
Torque on the Brake drum – 200 N.m ; Mean effective pressure – 6 Bar.
It consumes 4 kg of fuel per hour. The calorific value of Fuel = 42000 kJ/kg.
Determine
i) Indicated power ii) Brake power iii) Mechanical Efficiency
iv) Indicated Thermal Efficiency v) Brake Thermal Efficiency. **(10 Marks)**

Module-4

7 a. Define Composite material and how are composite materials classified. **(04 Marks)**

b. With a neat sketch, explain the working principle of TIG welding. **(08 Marks)**

c. Power is to be transmitted from one shaft to another shaft by means of Belt drive. The diameter of the larger pulley is 600mm and that of smaller pulley is 300mm. The distance between the centres of 2 pulleys is 3 mt. If the axes of the 2 shafts are in the same plane and parallel to each other, find the length of the belt required for

i) Open Belt drive ii) Crossed Belt drive. **(08 Marks)**

OR

8 a. Enumerate the advantages and disadvantages of Gear drive over Belt drive. **(04 Marks)**

b. Briefly explain about Thermo plastics and Thermo setting plastics. **(08 Marks)**

c. With a neat sketch, briefly explain the working principal of Arc welding. **(08 Marks)**

Module-5

9 a. How a Lathe is specified? **(04 Marks)**

b. Explain the basic elements of Core machine with a block diagram. **(08 Marks)**

c. With the help of a neat diagram, explain the Industrial Robot Anatomy. **(08 Marks)**

OR

10 a. Explain with a neat sketch, the Taper Turning Operation on a Lathe by Tail Stock Offset method. **(08 Marks)**

b. Differentiate between Open Loop and Closed Loop Control System. **(04 Marks)**

c. Explain briefly the following Machining Operation :

i) Thread cutting ii) Facing iii) Angular Milling iv) End Milling. **(08 Marks)**

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