CMR INSTITUTE OF TECHNOLOGY
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CBCS SCHEME

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18ME15/25

First/Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Write a note on solar energy and its conversion. **(10 Marks)**

b. Write a note on global warming and ozone depletion. **(10 Marks)**

OR

2 a. State and explain Zeroth law, First law and Second law of Thermodynamics. **(10 Marks)**

b. Find the enthalpy and specific volume of 1kg of steam at 8 bar. The dryness fraction is 0.9, super heated steam temperature is 300°C and the specific heat of the steam is 2.25 kJ / kg° k. Assume T_s = 170.4°C, V_g = 0.2403 m^3 / kg, V_f = 0.001115 m^3 / kg, h_f = 720.94 kJ /kg, hfg = 2046.5 kJ / kg. **(10 Marks)**

Module-2

3 a. With a neat sketch, explain the construction and working of Babcock and Wilcox boiler. **(10 Marks)**

b. What are the advantages and disadvantages of water tube boiler over fire tube boiler. **(10 Marks)**

OR

4 a. Sketch and explain the working principle of Pelton wheel turbine. **(10 Marks)**

b. Explain with neat sketch the working of centrifugal pump. **(10 Marks)**

Module-3

5 a. Explain 4 – stroke petrol engines with P – V diagram. **(10 Marks)**

b. A 4 – stroke diesel engine has a piston diameter of 250 mm, stroke length of 400 mm, mean effective pressure is 4 bar, diameter of brake drum is 1 m and speed is 500 rpm. Calculate the IP, BP and FP by assuming an effective break load of 400 N. **(10 Marks)**

OR

6 a. Explain the principle of working of a room air conditioner with a neat sketch. **(10 Marks)**

b. Explain with neat sketch the working principle of vapour absorption refrigeration. **(10 Marks)**

Module-4

7 a. Explain the principle of arc welding with a neat sketch. **(10 Marks)**

b. Differentiate between ferrous and non- ferrous metals. **(10 Marks)**

OR

8 a. Derive an evaluation for length of belt in open belt drive. **(10 Marks)**

b. Discuss the applications of composite materials in aerospace industry, automobile industry and recreation. **(10 Marks)**

Module-5

9 a. Explain five different operations carried out on a lathe. **(10 Marks)**

b. Explain the following with sketches:
i) Plane milling
ii) End milling
iii) Slot milling **(10 Marks)**

OR

10 a. With a neat sketch, explain the process of taper turning on a lathe using compound slide swiveling method. **(10 Marks)**

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b. Define a robot and explain the classification of robot based on physical configuration. **(10 Marks)**

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