



First/Second Semester B.E. Degree Examination, June/July 2024 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain with the help of neat sketch, working principle of Hydroelectric power plant. (08 Marks)
- b. Explain the steam formation process with T-h diagram. (08 Marks)
- c. Write a short note on Global warming. (04 Marks)

OR

- 2 a. Define Thermodynamic system. Differentiate between open system, closed system and Isolated system. (10 Marks)
- b. 5 kg of wet steam of dryness 0.8, passes from a boiler to a superheater at a constant pressure of 1 MPa absolute. In the superheater its temperature increases to 350°C. Determine the amount of heat supplied in the super heater. The specific heat of super heated steam, $CP_s = 2.25 \text{ KJ/kg.K}$ (10 Marks)

Module-2

- 3 a. Sketch and label all the parts of a Babcock and Wilcox boiler. Indicate the path of the flue gases and the water circulation. (10 Marks)
- b. List the important boiler mountings and accessories and mention their functions. (10 Marks)

OR

- 4 a. Sketch and explain working of a Pelton wheel. (10 Marks)
- b. Describe the working principle of centrifugal pump. (10 Marks)

Module-3

- 5 a. With the help of a P-V diagram, explain the working of a four stroke diesel engine. (10 Marks)
- b. A single cylinder four stroke engine runs at 1000 rpm and has a bore of 115 mm and has a stroke of 140 mm. The brake load is 6 kg, at 600 mm radius and mechanical efficiency is 80%. Calculate Brake power and mean effective pressure. (10 Marks)

OR

- 6 a. Explain with a neat sketch, the working of a vapour compression refrigeration system. (10 Marks)
- b. Explain briefly the following :
 - (i) Refrigerants
 - (ii) Ton of refrigeration
 - (iii) COP
 - (iv) Ice making capacity
 - (v) Relative COP

(10 Marks)

Module-4

- 7 a. With a neat sketch, explain MIG welding process. (08 Marks)
b. Define composites and give their applications. (06 Marks)
c. Classify and explain various types of ferrous metals. (06 Marks)

OR

- 8 a. Derive an expression for length of open belt drive. (10 Marks)
b. Classify and explain the importance of Gear drives. (10 Marks)

Module-5

- 9 a. Sketch and explain taper turning by swivelling the compound rest. (10 Marks)
b. With a neat sketch, explain principle parts of vertical milling machine. (10 Marks)

OR

- 10 a. Explain the advantages and applications of Robots in industries. (10 Marks)
b. With a neat block diagram, explain elements of CNC system. (10 Marks)

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