CBCS SCHEME

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15EME14/24

First/Second Semester B.E. Degree Examination, Jan./Feb. 2023
Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Distinguish between Renewable and Non – Renewable Energy Resources. **(04 Marks)**

b. List the requirements of an ideal fuel. **(04 Marks)**

c. With a neat figure, explain the construction and working of a Nuclear Power Plant. **(08 Marks)**

OR

2 a. With the help of Temperature – Enthalpy diagram, explain the process of steam formation at constant pressure. **(08 Marks)**

b. Explain the construction and working of Babcock and Wilcox boiler. **(08 Marks)**

Module-2

3 a. With a pressure – velocity diagram, explain the working of a Reaction turbine. **(04 Marks)**

b. With a neat sketch, explain the working of closed cycle gas turbine. **(04 Marks)**

c. Explain the working of Pelton wheel and Kaplan turbine, with a neat sketch. **(08 Marks)**

OR

4 a. With neat sketches, explain the working of four stroke petrol engine. **(08 Marks)**

b. A four cylinder four – stroke engine running at 1000rpm develops an indicated power of 15KW. The mean effective pressure is 5×10^5 N/m^2. Find the diameter of the cylinder and stroke of the piston when the ratio of diameter to stroke is 0.8. **(04 Marks)**

c. A four stroke single cylinder I.C. Engine of 250mm cylinder diameter and 400mm stroke runs at a piston speed of 8m/s. If the engine develops 50KW indicated power, find its mean effective pressure and the crankshaft speed. **(04 Marks)**

Module-3

5 a. Briefly explain the following operations on lathe and drilling, with neat sketches :
i) Knurling ii) Thread cutting iii) Reaming iv) Boring. **(08 Marks)**

b. With a neat sketch, explain the process of taper turning by swiveling the compound rest method. **(04 Marks)**

c. Briefly explain the following operations on milling, with neat sketch :
i) Plane milling ii) End milling. **(04 Marks)**

OR

6 a. Define a Robot. List the different physical configurations of Robot. Explain any two. **(08 Marks)**

b. Define Automation. Explain the different types of automation. **(08 Marks)**

Module-4

7 a. List the different Ferrous metals and alloys. Briefly explain the properties and applications of any four. **(08 Marks)**

b. Write a brief note on the following Non – Ferrous metals and alloys :

i) Copper and its alloys ii) Aluminum and its alloys

iii) Lead based alloys iv) Nickel based alloys. **(08 Marks)**

OR

8 a. Define Welding. Briefly explain the different types of Oxy – acetylene flames. **(04 Marks)**

b. Write the differences between soldering and Brazing. **(04 Marks)**

c. With a neat figure, explain the process of Electric Arc Welding. **(08 Marks)**

Module-5

9 a. With a block diagram, explain the different parts of a refrigerator. **(04 Marks)**

b. Define the following :

i) Refrigeration effect ii) Ton of refrigeration

iii) Ice making capacity iv) Co-efficient of performance. **(04 Marks)**

c. With a neat sketch, explain the construction and working of Vapour Compression Refrigerator. **(08 Marks)**

OR

10 a. Briefly explain the properties of a good refrigerant. **(08 Marks)**

b. With a neat sketch, explain the construction and working of Room Air Conditioner. **(08 Marks)**

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