CBCS SCHEME

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17EME14/24

First/Second Semester B.E. Degree Examination, Jan./Feb. 2021
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. Enumerate the differences between Non-Renewable and Renewable sources of energy. **(06 Marks)**

b. Write explanatory note on the working of a Nuclear power plant with the aid of a neat sketch. **(10 Marks)**

c. Define and classify biofuels with examples. **(04 Marks)**

OR

2 a. Elucidate the formation of steam at constant pressure with the help of T-H diagram. **(08 Marks)**

b. Explain the construction and working of a Babcock and Wilcox Boiler with a neat sketch. **(12 Marks)**

Module-2

3 a. Briefly bring out the working of De Laval Turbine with the help of a neat sketch. **(08 Marks)**

b. Illustrate the differences between open cycle and closed cycle Gas Turbines. **(04 Marks)**

c. Briefly explain the working of Kaplan water turbine with a neat sketch. **(08 Marks)**

OR

4 a. Explain the operation of Four stroke petrol engine with the help of thermodynamic cycle. **(12 Marks)**

b. A test on a 4 stroke engine reveals the following data: stroke = 40cm; Bore = 25cm; speed = 250rpm; Brake load = 70kgs; brake drum diameter = 2m; mean effective pressure = 6 bar; oil consumption = 0.1 liter/min; specific gravity = 0.78; calorific value of oil = 43900kJ/kg. Compute:

i) Indicated power
ii) Brake power
iii) Mechanical efficiency
iv) Indicated thermal efficiency
v) Brake specific fuel consumption. **(08 Marks)**

Module-3

5 a. Explain the following operations on Lathe with sketches:

i) Cylindrical Turning
ii) Thread cutting
iii) Taper turning by swiveling the compound rest **(08 Marks)**

b. With neat sketches, explain the following operations on a drilling machine

i) Boring
ii) Counter boring
iii) Tapping **(08 Marks)**

c. Bring out the differences between upmilling and down milling. **(04 Marks)**

OR

6 a. Bring out complete classification of Robot configurations and explain any one configuration with a suitable sketch. **(10 Marks)**

b. Define Automation, classify and explain them with examples for each category. **(10 Marks)**

Module-4

7 a. Bring out detailed classifications of ferrous and Non-ferrous metals and explain any two under each classification of ferrous and non-ferrous metals. **(08 Marks)**

b. Define composite materials and classify them. Also, list the advantages and applications of composite materials. **(12 Marks)**

OR

8 a. With a neat diagram, explain how Oxy-acetylene welding is carried out. Also, identity different types of flame in Oxy-acetylene welding. **(08 Marks)**

b. Differentiate between soldering and brazing. **(06 Marks)**

c. State the advantages and disadvantages of welding over soldering and brazing. **(06 Marks)**

Module-5

9 a. Define the following terms associated with refrigeration:

i) Ton of Refrigeration
ii) Refrigeration effect
iii) Ice making capacity
iv) Coefficient of performance. **(08 Marks)**

b. Explain with a neat sketch principle and working of Vapour Absorption Refrigeration. **(12 Marks)**

OR

10 a. List out and briefly explain the desirable properties of a Refrigerant. **(10 Marks)**

b. Explain the working of a Room Air conditioner with the help of a neat sketch. **(10 Marks)**

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