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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 (08 Marks)
 - 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, identify 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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