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ISEME14/24

First/Second Semester B.E. Degree Examination, Dec.2016/Jan.2017

Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define renewable and non-renewable energy resources and differentiate them. (06 Marks)
b. With the help of T—H diagram, explain the generation of steam at constant pressure. (10 Marks)

OR

- 2 a Define : i) Dryness fraction ii) Sensible heat iii) Latent heat iv) Enthalpy of steam. (04 Marks)
b. Draw a neat diagram and explain the construction and working of "Liquid flat plate collector" used for water heating applications. (12 Marks)

Module-2

- 3 a. What is steam turbine? Show the classifications of steam turbine. (06 Marks)
b. With a neat sketch, explain the working of Francis's turbine. (10 Marks)

OR

- 4 a. With the help of $P-V$ diagram, explain the operation of 4—S petrol engine. (08 Marks)
b. Following data are collected from a 4—S single cylinder engine at full load.
Bore = 200mm ; stroke = 280mm ; speed = 300rpm. Indicated mean effective pressure = 5.6 bar, Torque on the brake drum = 250N-m, fuel consumed = 4.2kg/hour, and calorific value of fuel = 41,000 kJ/kg.
Determine :
i) Mechanical efficiency
ii) Indicated thermal efficiency, and
iii) Brake thermal efficiency. (08 Marks)

Module-3

- 5 a. With simple sketches, explain the following lathe operations :
i) Facing ii) Cylindrical turning. (06 Marks)
b. Define automation. Discuss the types of automation along with their merits and demerits. (10 Marks)

OR

- 6 a. Show the differences between drilling and boring. (04 Marks)
b. Define robot. State the different types of robot configurations. (04 Marks)
c. Draw a neat diagram to show the robot arm movement in Cartesian configuration and explain. (08 Marks)

Module-4

- 7 a. State the characteristics and applications of : i) Aluminium and its alloys ii) Copper and its alloys. (08 Marks)
b. Differentiate between soldering and brazing. (04 Marks)
c. State the advantages and disadvantages of welding over other types of processes. (04 Marks)

15EME14/24

OR

- 8 a. List the advantages and limitations of composites. (08 Marks)
b. With a neat diagram, explain the Oxy-acetylene welding process. (08 Marks)

Module 5

- 9 a. Define refrigeration. State the applications of refrigeration. (04 Marks)
b. Define the following refrigeration terms :
i) Refrigerant ii) ton of refrigeration iii) COP iv) relative COP. (04 Marks)
c. With the help of a flow diagram, explain the functioning of "Vapour compression refrigeration cycle". (08 Marks)

OR

- 10 a. What is refrigerant? State the desired properties of refrigerant. (06 Marks)
b. Draw a neat diagram of a room air conditioner and explain. (10 Marks)

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