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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)

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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)