CBCS Scheme

USN | | | | | | | | | |

15EME14/24

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 Franci'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 = 41,000kJ/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 joining processes. **(04 Marks)**

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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