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First/Second Semester B.E. Degree Examination, June/July 2019 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions, choosing one full question from each module.
2. Use of Steam table is permitted.

Module-1

- 1 a. List and explain any one source of energy. (06 Marks)
- b. Explain briefly : (i) Global Warming (ii) Ozone depletion (06 Marks)
- c. Find the enthalpy of 1 kg of steam at 12 bar when,
 - (i) Steam is dry saturated.
 - (ii) Steam is 22% wet and
 - (iii) Super heated to 250°C
 Assume the specific heat of the super heated steam as 2.25 KJ/kgK. (08 Marks)

OR

- 2 a. Explain briefly any two of the following:
 - (i) Zeroth law of thermodynamics.
 - (ii) First law of thermodynamics.
 - (iii) Second law of thermodynamics. (06 Marks)
- b. Explain formation of steam with the help of Temperature-Enthalpy (T-h) diagram. (08 Marks)
- c. Find the specific volume and enthalpy of 1 kg of steam at 0.8 MPa.
 - (i) When the dryness fraction is 0.9.
 - (ii) When the steam is super heated to a temperature of 300°C.
 The specific heat of the super heated steam is 2.25 KJ/kgK. (06 Marks)

Module-2

- 3 a. With a neat labeled diagram, explain working of Babcock and Wilcox boiler. (08 Marks)
- b. Define prime movers and explain working of Pelton wheel turbine with a neat sketch. (12 Marks)

OR

- 4 a. Define (i) Boiler Mountings. (ii) Boiler Accessories. (12 Marks)
- Explain functions of any five mountings or accessories.
- b. What are hydraulic pumps? Explain centrifugal pump with a neat sketch. (08 Marks)

Module-3

- 5 a. Explain 4-s petrol engines with P-V diagram. (10 Marks)
- b. Give comparisons between petrol and diesel engines. (05 Marks)
- c. A four stroke IC engine running at 450 rpm has a bore diameter of 100 mm and stroke length 120 mm. The indicated diagram details are,
 - (i) Area of the diagram 4 cm²
 - (ii) Length of the indicated diagram 6.5 cm
 - (iii) Spring value of the spring used 10 bar/cm.
 Calculate the indicated power of the engine. (05 Marks)

OR

- 6 a. Explain with a neat sketch working of vapour compression Refrigerator. (08 Marks)
 b. Define : (i) Ton of Refrigerator (ii) COP (iii) Ice making capacity (06 Marks)
 c. List commonly used refrigerants and mention the applications of air conditioners. (06 Marks)

Module-4

- 7 a. Classify ferrous and non ferrous metals. (05 Marks)
 b. Define composites, explain any two of the following : (i) Piezoelectric materials. (05 Marks)
 (ii) Shape memory alloys (iii) Optical fibre glass.
 c. Classify metal joining processes, explain TIG (Tungsten Inert Gas) Welding with a neat sketch. (10 Marks)

OR

- 8 a. Derive an expression for length of the belt in open belt drive. (10 Marks)
 b. Mention advantages and disadvantages of V-Belt drive. (05 Marks)
 c. List different types of gears and explain any one with its advantages. (05 Marks)

Module-5

- 9 a. Explain briefly the following:
 (i) Turning
 (ii) Facing
 (iii) Thread cutting (06 Marks)
 b. Explain the working of horizontal milling machine with a simple line diagram. (08 Marks)
 c. Explain briefly:
 (i) Angular milling.
 (ii) Gang milling.
 (iii) Plane milling. (06 Marks)

OR

- 10 a. Explain briefly the components of a CNC machine with a neat block diagram. (08 Marks)
 b. Define Robots and mention its general applications. (07 Marks)
 c. Write short note on:
 CNC Machining Center or Turning Center. (05 Marks)

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