First/Second Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Distinguish between conventional and non-conventional sources of energy. (08 Marks)
   b. With neat sketch, explain principle of working of Hydrostatic power plant. (08 Marks)
   c. State and explain the Zeroth law of thermodynamics. (04 Marks)

OR

2 a. Distinguish between: i) Open System and closed system ii) Heat and work (06 Marks)
   b. Define: i) Sensible heat ii) Latent heat iii) Dryness fraction iv) Wet steam. (08 Marks)
   c. Find the specific volume and enthalpy of 1kg of steam at 0.8MPa. i) When the dryness fraction is 0.9, ii) When the steam is superheated to a temperature of 300°C. The specific heat of superheated steam is 2.25kJ/kg K. (06 Marks)

Module-2

3 a. Explain with a neat sketch, the working of Babcock and Wilcox boiler. (12 Marks)
   b. Write a brief note on:
      i)   Priming of pumps
      ii) Cavitation in pumps. (08 Marks)

OR

4 a. List and explain in brief, the boiler mountings and accessories. (10 Marks)
   b. Sketch and explain the working of Pelton wheel. (10 Marks)

Module-3

5 a. With help of PV diagram, explain the working of four stroke petrol engine. (08 Marks)
   b. Mention the advantages of two stroke engine over four stroke engine. (06 Marks)
   c. List the desirable properties of an ideal refrigerant. (06 Marks)

OR

6 a. With neat sketch explain the working principle of vapour absorption refrigeration system. (08 Marks)
   b. Calculate the brake power of a single cylinder four stroke petrol engine which is running at a speed of 400rpm. The load on the brake drum is 24kg and the spring balance reads 4kg. The diameter of the brake drum is 600mm and the rope diameter is 30mm. (06 Marks)
   c. Define: i) Refrigeration ii) COP iii) Ton of refrigeration. (06 Marks)

Module-4

7 a. Differentiate between ferrous and non ferrous metals. (06 Marks)
   b. What is a composite? How are composite materials classified? List the applications of composite materials. (08 Marks)
   c. Distinguish between soldering, brazing and welding. (06 Marks)

OR

8 a. Describe the principle of arc welding with suitable welding circuit diagram. (08 Marks)
   b. What are the advantages and disadvantages of gear drive? (06 Marks)
   c. Define slip with reference to belt drive. Why it occurs explain the phenomenon of creep in belt drives. (06 Marks)

Module-5

9 a. Draw a neat sketch of engine lathe and label the parts. (10 Marks)
   b. Explain the following with sketches:
      i) Up milling
      ii) Down milling
      iii) Face milling. (10 Marks)

OR

10 a. Define a robot and list the classification of robot based on physical configuration. (08 Marks)
    b. List and explain various components of CNC. What are the advantages and disadvantages of CNC? (12 Marks)