# CBCS SCHEME

## First/Second Semester B.E. Degree Examination, June/July 2024
## 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. Explain with the help of neat sketch, working principle of Hydroelectric power plant.
                                                                    (08 Marks)
   b. Explain the steam formation process with T-h diagram.          (08 Marks)
   c. Write a short note on Global warming.                          (04 Marks)

**OR**

2  a. Define Thermodynamic system. Differentiate between open system, closed system and Isolated system.                                       (10 Marks)
   b. 5 kg of wet steam of dryness 0.8, passes from a boiler to a superheater at a constant pressure of 1 MPa absolute. In the superheater its temperature increases to $350°C$. Determine the amount of heat supplied in the super heater. The specific heat of super heated steam, $CP_s = 2.25\,KJ/kg.K$                          (10 Marks)

### Module-2

3  a. Sketch and label all the parts of a Bobcook and Wilcox boiler. Indicate the path of the flue gases and the water circulation.                        (10 Marks)
   b. List the important boiler mountings and accessories and mention their functions.  (10 Marks)

**OR**

4  a. Sketch and explain working of a Pelton wheel.                  (10 Marks)
   b. Describe the working principle of centrifugal pump.            (10 Marks)

### Module-3

5  a. With the help of a P-V diagram, explain the working of a four stroke diesel engine.
                                                                    (10 Marks)
   b. A single cylinder four stroke engine runs at 1000 rpm and has a bore of 115 mm and has a stroke of 140 mm. The brake load is 6 kg, at 600 mm radius and mechanical efficiency is 80%. Calculate Brake power and mean effective pressure.         (10 Marks)

**OR**

6  a. Explain with a neat sketch, the working of a vapour compression refrigeration system.
                                                                    (10 Marks)
   b. Explain briefly the following :
      (i)    Refrigerants
      (ii)   Ton of refrigeration
      (iii)  COP
      (iv)   Ice making capacity
      (v)    Relative COP                                            (10 Marks)

## Module-4

7  a. With a neat sketch, explain MIG welding process. **(08 Marks)**
   b. Define composites and give their applications. **(06 Marks)**
   c. Classify and explain various types of ferry metals. **(06 Marks)**

**OR**

8  a. Derive an expression for length of open belt drive. **(10 Marks)**
   b. Classify and explain the importance of Gear drives. **(10 Marks)**

## Module-5

9  a. Sketch and explain taper turning by swivelling the compound rest. **(10 Marks)**
   b. With a neat sketch, explain principle parts of vertical milling machine. **(10 Marks)**

**OR**

10 a. Explain the advantages and applications of Robots in industries. **(10 Marks)**
   b. With a neat block diagram, explain elements of CNC system. **(10 Marks)**

* * * * *