USN | | | | | | | | | |

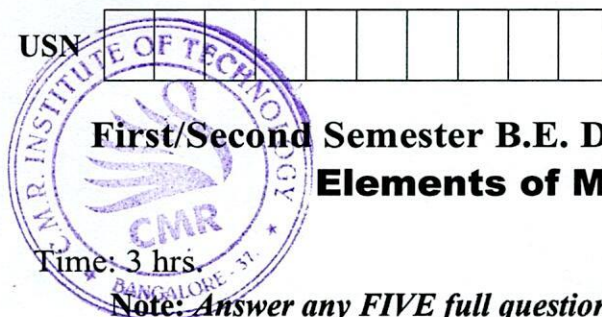**First/Second Semester B.E. Degree Examination, Dec.2024/Jan.2025**
Elements of Mechanical Engineering

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. With a neat sketch, explain briefly hydro-electric power plant.   (10 Marks)
   b. Discuss briefly global warming and ozone depletion.   (10 Marks)

OR

2 a. Define : i) open system   ii) closed system.   (05 Marks)
   b. State and explain Zeroth law of thermodynamics.   (05 Marks)
   c. Explain briefly formation of steam at constant pressure with temperature enthalpy diagram.
                                                                               (10 Marks)

Module-2

3 a. Explain briefly the working of Babcock and Wilcox boiler.   (10 Marks)
   b. Define turbine. Explain with a neat sketch working of pelton wheel turbine. (10 Marks)

OR

4 a. Briefly explain the construction and working of Francis turbine.   (10 Marks)
   b. Write short notes on : i) Cavitation ii) Priming.   (10 Marks)

Module-3

5 a. With a neat sketch, explain constructional details of 2 stroke petrol engine. (10 Marks)
   b. The following datas were obtained for 4-stroke diesel engine.

   Cylinder diameter   = 25 cm
   Stroke   = 40 cm
   Speed   = 250 rpm
   Brake load   = 70 Kg
   Brake drum diameter   = 2 m
   Mean effective pressure   = 6 bar
   Diesel oil consumption   = 0.1 m^3/min
   Specific gravity of diesel = 0.78
   Calorific value of fuel diesel = 43,900 kJ/Kg

   Find i) Brake power   ii) Indicated power   iii) Friction power   iv) Mechanical Efficiency
   v) Brake Thermal Efficiency.   (10 Marks)

OR

6 a. Define : i) Ton of refrigeration   ii) COP   iii) Refrigeration effect   iv) Ice making capacity
       v) Refrigeration.   (10 Marks)
   b. Explain briefly with a neat sketch working of vapour compression Refrigeration.   (10 Marks)

Module-4

7 a. Write a note on Ferrous Alloys (Any two).   (10 Marks)
   b. Explain briefly the types and applications of Non-Ferrous Alloys (Any three).   (10 Marks)

OR

8 a. What is Welding? With neat sketch explain arc welding.   (10 Marks)
   b. With a neat sketch, explain briefly soldering method.   (10 Marks)

Module-5

9 a. Explain briefly with neat sketches the following lathe operations :
       i) Turning   ii) Facing   iii) Knurling   iv) Drilling.   (10 Marks)
   b. Explain with a neat sketch taper turning by swivelling compound rest method.   (10 Marks)

OR

10 a. Sketch and explain polar and Cartesian coordinate Robot configuration. (10 Marks)
    b. Explain briefly working of horizontal milling machine with a neat sketch.   (10 Marks)

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