CBCS SCHEME

USN | | | | | | | | | | |

21EME15/25

First/Second Semester B.E. Degree Examination, Jan./Feb. 2023
Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of thermodynamic data handbook is permitted.

Module-1

1 a. Explain the formation of steam with the help of Temperature – Enthalpy [T – H] diagram. **(10 Marks)**

b. With a neat sketch explain, construction and working principle of Hydel power plant. **(10 Marks)**

OR

2 a. Find the enthalpy of 2 kg of steam at 12 bar when
i) Steam is dry saturated
ii) Steam is 85% dry
iii) Superheated at 250°C
Assume the specific heat of superheated steam as 2.25 kJ/kg-K. **(10 Marks)**

b. With a neat sketch explain the working principle of Pelton turbine. **(10 Marks)**

Module-2

3 a. Write a note on:
i) Piezo - electric materials
ii) Glass
iii) Semi-conductors
iv) Shape-memory alloys **(08 Marks)**

b. Differentiate between soldering, brazing and welding processes. **(12 Marks)**

OR

4 a. With the help of neat sketch explain Oxy-acetylene gas welding process. **(10 Marks)**

b. Write a note on three modes of heat transfer phenomena. **(10 Marks)**

Module-3

5 a. Explain with the help of theoretical P-V diagram working of four stroke diesel engine. **(10 Marks)**

b. Define the following :
i) Refrigeration process
ii) Refrigeration effect
iii) Ton of refrigeration
iv) COP
v) Air-conditioning process. **(10 Marks)**

OR

6 a. List and explain the desirable properties of a good refrigerant. **(10 Marks)**

b. With the help of neat sketch, explain the working principle of room air-conditioning system. **(10 Marks)**

Module-4

7 a. Define velocity ratio of belt drives. Explain with a neat sketch open belt drive. **(10 Marks)**

b. Define Machines and Mechanisms. Enumerate the applications of linear motion, oscillatory motion and rotary motion. **(10 Marks)**

OR

8 a. Give a brief comparison between belt drive and gear drive. **(06 Marks)**

b. Write a note on :

i) Spur Gear ii) Bevel Gear **(04 Marks)**

c. Define Robotics. With a neat sketch explain Jointed-arm configuration robot. **(10 Marks)**

Module-5

9 a. With a help of necessary sketches explain the following lathe operations :

i) Turning

ii) Facing

iii) Knurling

iv) Taper turning by swivelling compound rest. **(12 Marks)**

b. Explain the components of CNC machine with a neat block diagram. **(08 Marks)**

OR

10 a. Explain with a neat sketch the following operations:

i) Plane milling

ii) End milling

iii) Drilling

iv) Boring **(12 Marks)**

b. Define mechatronics. With a neat block diagram explain closed loop control system. **(08 Marks)**

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