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ME 103

B. TECH. I[st] SEMESTER EXAMINATION, 2025-26

BACHELOR OF TECHNOLOGY

(ME & CSE, CSE-AIML)

Fundamentals of Mechanical Engineering and Mechatronics

Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Attempt **all** part of the following : 5×3=15

   (a) Define stress and strain.

   (b) Define the coefficient of performance of refrigeration and tone of refrigeration.

   (c) Define dynamic and kinematic viscosity with unit.

(d) Define hybrid vehicle and write its component.

(e) Define transducer and actuator.

Section-B

Note: Attempt **all** question : 4×5=20

2. (a) Define the beam. Explain the various types of beam with neat sketch.

Or

(b) Derived the relation between E, K, and μ where the symbol used in usual meaning.

3. (a) Gives the classification of fluid and define various types of fluid with example.

Or

(b) Explain the continuity principle. A pipe through which water is flowing, is having diameters 20 cm and 10 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is given 6 m/s. Find velocity at section 2 also find the discharge.

4. (a) Write the difference between SI and CI engine.

Or

(b) Define psychometric and explain the terms specific Humidity, Dry bulb temperature, Wet bulb temperature and dew point temperature.

5. (a) What is sensor ? Explain the various types of sensor.

Or

(b) Explain the in detail the various industrial application of mechatronics.

Section-C

Note: Attempt any **two** questions : 2×20=40

6. Explain the stress-strain diagram of ductile materials with the neat sketch and also explain the various point on stress-strain diagram. Also differentiate the true stress and engineering stress.

7. State the Bernoulli principle and derived the Bernoulli equation with their assumptions.

8. Explain Working principle of four stroke engine with neat sketch. How it different from two stroke engine.

9. Discuss the scope, advantage and disadvantage of mechatronics with example.

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