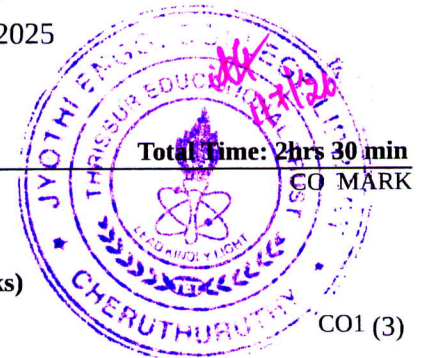


Reg No.: _____

Name : _____

**Jyothi Engineering College(Autonomous)**

B. Tech Degree S2 (S) Examination, June 2026 (2025 Scheme)

25CET205 - MECHANICS OF SOLIDS**Total Mark: 60****PART A**

(Answer All Questions. Each question carries 3 marks)

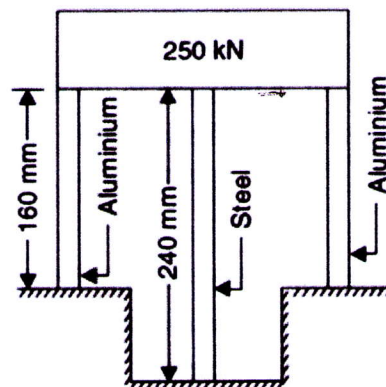
1. Define lateral strain and longitudinal strain. CO1 (3)
2. Write two equations used to find the forces in compound bars made of two materials subjected to tension. CO2 (3)
3. What do you mean by point of contraflexure? State its significance. CO2 (3)
4. Draw shear force and bending moment diagram for a simply supported beam with uniformly distributed load. CO2 (3)
5. Define slope and deflection. CO3 (3)
6. State the assumptions in the Theory of Simple Bending. CO3 (3)
7. State the limitations of Euler's formula. CO1 (3)
8. Define Kern of section and describe its importance. CO2 (3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module - 1

9. Three pillars, two of aluminium and one of steel support a rigid platform of 250 kN as shown in figure. If area of each aluminium pillar is 1200mm^2 and that of steel pillar is 1000mm^2 , find the stresses developed in each pillar. Take $E(\text{aluminium}) = 1 \times 10^6\text{N/mm}^2$, $E(\text{steel}) = 2 \times 10^5\text{N/mm}^2$ CO3 (9)

**OR**

10. A tensile test was conducted on a mild steel bar. The following data was obtained from the test:

CO2 (9)

- (i) Diameter of the steel bar = 3 cm
- (ii) Gauge length of the bar = 20 cm
- (iii) Load at elastic limit = 250 kN
- (iv) Extension at a load of 150 kN = 0.21 mm
- (v) Maximum load = 380 kN
- (vi) Total extension = 60mm
- (vii) Diameter of the rod at the failure = 2.25 cm

Determine: (a) the Young's modulus, (b) the stress at elastic limit,
(c) the percentage elongation, and (d) the percentage decrease in area.

Module - 2

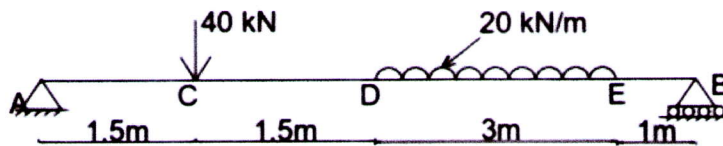
11. A cantilever 6m long carries load of 30, 70, 40 and 60 kN at a distance of 0, 0.6, 1.5 and 2m respectively from the free end. Draw the SF and BM diagram for the cantilever.

CO2 (9)

OR

12. Draw SFD and BMD for the beam shown below. Indicate also the position and magnitude of maximum bending moment.

CO2 (9)



Module - 3

13. An I-sections, with rectangular ends, has the following dimensions: Flanges 200mm x 25 mm. Web 12.5mm thick and 300 mm deep. It is used as a simply supported beam of span 10 meter and carrying a UDL of 40 kN/m for the entire length. Draw the shear stress distribution considering the critical section for shear.

CO3 (9)

OR

14. A symmetrical I section has the following dimensions. Flanges: 15 cm x 2 cm, Web 30 cm x 2 cm. Find the maximum shearing stress developed in the beam for a shearing force of 10 kN. Draw the stress variation.

CO3 (9)

Module - 4

15. The diameter ratio of a hollow shaft is 0.6. It is required to transmit 600 kW at 200 rpm. Determine the diameter, if the allowable stress in the material is 100 N/mm^2 and the angle of twist over 3 m length is not to exceed 1.5° . Take $G = 78 \text{ kN/mm}^2$.

CO6 (9)

OR

16. A short column of rectangular cross section 80 mm x 60 mm carries a load of 40 kN at a point 20 mm from the longer side and 35 mm from the shorter side. Determine the maximum compressive and tensile stresses in the section.

CO3 (9)
