ME 221 (R-20)

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II/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2024

Second Semester

MECHANICAL ENGINEERING

STRENGTH OF MATERIALS - II

Time : **Three Hours** Maximum : **70** Marks

Answer ONE question from each Unit. 5x14=70 M

All Questions carry equal marks.

UNIT - I

1. A girder of uniform section and constant depth of 300 mm is freely supported over a span of 5m. Calculate the deflection for a uniformly distributed load on it such that the maximum bending stress induced 150 N/mm^2. Take E = 2 x 10^5 N/mm^2.

(OR)

2. A cantilever beam of AB of length L carries a point W at its free end B and fixed at A. Find the slope and deflection at a point C distant L/4 from the free end B.

UNIT - II

3. Explain Rankine's formula with each and every term in it.

(OR)

4. Explain Euler's formula with assumptions and limitations.

UNIT - III

5. A continuous beam having three spans of 4m, 5m, 6m and carries the loads of 8kN/m, 9kN/m, 10kN/m. Determine the bending moments and reactions at the supports.

(OR)

6. Derive the expression for Clapeyron's theorem of three moments.

UNIT - IV

7. Find the thickness of metal necessary for a cylindrical shell of internal diameter 160mm to withstand an internal pressure of 8 N/mm^2, the maximum hoop stress in the section is not to exceed 35 N/mm^2.

P.T.O.

(OR)

8. Write down expressions for circumferential stress for thin spherical shell explaining each and every term.

UNIT - V

9. An I section beam 350mm x 150mm has a web thickness of 10mm and a flange thickness of 20mm. If the shear force acting on the section is 40kN, find the maximum shear stress developed in the I section. Also sketch the shear stress distribution across the section.

(OR)

10. Define shear centre and how it will determine for channel section.