



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Mechanical Engineering

Make-up Examination; March/April - 2022

Mechanics of Materials

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

1. Draw the stress-strain diagram for mild steel and explain various salient features. 20
2. Explain various types of stresses and strains. 20

UNIT - II

- 3 a. Define Thermal stresses and Explain thermal stresses in compound bars. 12
- b. Write a note on principal planes and stresses. 8
4. Explain the construction of Mohr's circle diagram. 20

UNIT - III

5. Explain the various types of beams, loads and supports. 20
- 6 a. Derive the relationship between load intensity shear force and bending moment 10
- b. Draw the nature of Shear force and bending moment diagram for the simply supported beam carrying a point load. 10

UNIT - IV

- 7 a. Derive relationship between bending stress and radius of curvature. 10
- b. Derive the relationship between Bending moment and radius of curvature 10
8. Derive the relationship between slope, deflection and radius of curvature for beams 20

UNIT - V

- 9 a. Derive torsional equations for shaft. 10
- b. A solid shaft is subjected to a maximum torque of 25 kn-m. Find a suitable diameter of a solid shaft, if the allowable shear stress and twist are limited to 80 N/mm² and one degree respectively for a length of 20 times the diameter of the shaft. 10
Assume G = 80 Gpa
10. Derive Euler equation for columns with both ends hinged 20

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