Code: 9A01301

R9

B.Tech II Year I Semester (R09) Supplementary Examinations, May 2012

MECHANICS OF SOLIDS

(Common to AE, ME and MCT)

Time: 3 hours | Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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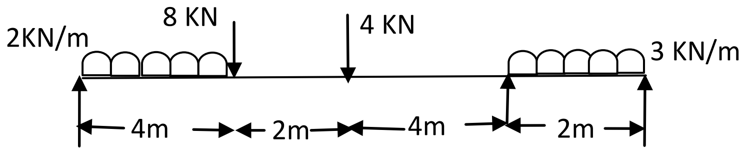
1 Explain stress strain diagram for mild steel.

2 Draw the S.F. and B.M. diagram for the beam shown in figure indicating principal values.



3 (a) Write the assumptions in the theory of simple bending.
(b) State and prove the theory of simple bending.

4 A beam of square section is used as a beam with one diagonal horizontal. Find the magnitude and location of maximum shear stress in the beam. Also sketch the shear stress distribution across the section.

5 State the assumptions and derive the theory of pure torsion $\frac{f_s}{R} = \frac{q}{r} = \frac{N\theta}{L}$.

6 A simply supported beam of span 10 m carries a point load of 30 KN at a distance of 4 m from the left end, compute: (i) The slope at the left end (ii) The deflection under the load (iii) The deflection at the mid-span and (iv) The maximum deflection and its location.TakeE = $2x10^5$ N/mm^2 and I = 6 x 10^8 mm^4.

7 A copper tube, 38 mm external diameter, 35.5 mm internal diameter, is closely wound with steel wire 0.75 mm dia. Stating clearly the assumptions made, estimate the tension at which the wire must have been wound if an internal pressure of 2 N/mm^2 produces a tensile circumferential stress of 7 N/mm^2 in the tube. Take E_s = 1.8 E_c.

8 A compound cylinder, formed by shrinking one tube on to another, is subjected to an internal pressure of 60 N/mm^2. Before the fluid is admitted, the internal and external diameter of the compound cylinder are 100 mm and 180 mm, and the diameter at the junction is 150 mm. If after shrinking on, the radial pressure at the common surface is 12 N/mm^2, calculate the final stresses setup by the section.

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