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Code No: CE1503

GEC-R14

II B. Tech I Semester Supplementary Examinations, January 2017

MECHANICS OF SOLIDS-I

(Civil Engineering)

Time: 3 Hours

Max. Marks: 60

Note: All Questions from **PART-A** are to be answered at one place.

Answer any **FOUR** questions from **PART-B**. All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. Define elasticity and plasticity
2. Define resilience and modulus of resilience.
3. What are the shapes of the Shear Force and Bending moment diagrams for Cantilever beam with end point load
4. Define point of contra- flexure and give its significance?
5. What assumptions are taken in the analysis of shear stress in beams?
6. List out any two assumptions made in the analysis of perfect frames.

PART-B

4 × 12 = 48M

1. Three bars made of copper; zinc and aluminum are of equal length and have cross section 500, 750 and 1000 square mm respectively. They are rigidly connected at their ends. If this compound member is subjected to a longitudinal pull of 250 k N, estimate the proportional of the load carried on each rod and the induced stresses. Take the value of E for copper = 1.3×10^5 N/mm², for Zinc = 1.0×10^5 N/mm² and for aluminum = 0.8×10^5 N/mm².
2. Define Proof resilience and Derive the expression for strain energy stored in a body when the load is applied with impact.
3. A beam 5 m long, supported at the ends carries points loads of 140 k N, 60 k N and 80 k N at distances 0.5 m, 2.5 m and 3.5 m respectively from the left end. Find the maximum S.F. and B.M. Draw the S.F. and B.M. diagrams.
4. The tension flange of a girder of I – section is 240 mm X 40 mm, where as the compression flange 120 mm X 20 mm. The web is 300 mm deep and 20 mm thick. If the girder is used as a simply supported beam of 8m span, determine the load per m run if the allowable stress is 90MPa in compression and 30 MPa in tension.
5. A rectangular beam 100 mm wide and 250 mm deep is subjected to a maximum shear force of 50 kN. Determine:
 - i) Average shear stress.
 - ii) Maximum shear stress, and
 - iii) Shear stress at a distance of 25 mm above the neutral axis.

6. A pin jointed frame is supported at A and B and loaded as shown in figure. Find the forces in all the members of the frame and state in each case, whether the force is tensile or compressive.


