Code: R7210103

R07

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2013
STRENGTH OF MATERIALS - I
(Civil Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

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1　(a)　Define stress and strain and specify the units for both. Write two examples for each of the ductile material and brittle material.
　(b)　A steel rod 4 m long and 20 mm diameter subjected to an axial tensile load of 45 kN. Find the change in length, diameter and the volume of the rod. Take $E_S = 2.0 \times 10^5$ N/mm^2 and Poisson's ratio = 0.25.

2　A tensile load of 60 kN is gradually applied to a circular bar of 4 cm diameter and 5 m long. If the value of $E = 2.0 \times 10^5$ N/mm^2, determine; Stretch in the rod, stress in the rod, strain energy absorbed by the rod.

3　A cantilever 2.0 m long is loaded with a uniformly distributed load of 2 kN/m run over a length of 1.25 m from the free end. It also carries a point load of 2.5 kN at a distance of 0.25 m from the free end. Draw the shear force and bending moment diagrams of the cantilever.

4　Derive the bending equation stating the assumptions made. Draw the strain variation, stress variation across the cross – section of the beam.

5　A rectangular beam 100 mm wide is subjected to a maximum shear force of 100 kN. Find the depth of the beam if the maximum shear stress is 6 N/mm^2.

6　(a)　What are the limitations of the moment area method?
　(b)　State and prove moment area theorem-1.

7　Define the terms:
　(a)　Circumferential stress.
　(b)　Longitudinal stress and derive the expressions for the same in thin cylinders.

8　Derive a formula for the difference of radii for shrinkage of a compound thick cylindrical shell.

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