R13

Code: 13A01301

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

STRENGTH OF MATERIALS - I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Explain stress –strain diagram for mild steel.
(b) Explain impact and shock loadings.
(c) Explain simply supported beam and its end conditions.
(d) Explain the rate of loading at a section of a beam.
(e) Write the assumptions in theory of simple bending.
(f) Derive the section modulous for rectangular section.
(g) Explain double integration method.
(h) Explain the elastic line of a beam.
(i) Explain a real beam.
(j) Write the conditions for stability.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 A tensile load of 50 kN is acting on a rod of diameter 35 mm and of length 6 m. A bore of diameter 25 mm is made centrally on the rod. To what length the rod should be bored so that the total extension will increase 30% under the same tensile load. Take E= 2 x 10^5 N/mm^2.

(OR)

3 A metallic bar 300 mm x 100 mm x 50 mm is subjected to a force of 6 kN (tensile), 8 kN (tensile) and 5 kN (tensile) along x,y, and z direction respectively. Determine the change in the volume of the block. Take E = 2 x 10^5 N/mm^2 and Poisson's ratio = 0.25.

UNIT - II

4 A cantilever of length 3 m carries a uniformly distributed load of 2.5 kN/m length over the whole length and a point of 3.5 kN at the free end. Draw SFD and BMD for the cantilever.

(OR)

5 A simply supported beam of length 8 m, carries point load of 4 kN and 7 kN at distances 3 m and 6 m from the left end. Draw SFD and BMD for the beam.

UNIT - III

6 Derive the bending equation.

(OR)

7 A beam of cross – section of an isosceles triangle is subjected to a shear force of 45 kN at a section where base width = 125 mm and height = 400 mm. Determine:
(i) Horizontal shear stress at the neutral axis.
(ii) The distance from the top to the beam where shear stress is maximum and
(iii) Value of maximum shear stress.

UNIT - IV

8 Derive the relation between slope, deflection and radius of curvature.

(OR)

9 Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 6 m, which is carrying a point load of 5 kN at a distance of 2 m from the left end. Take E = 2 x 105^5 N/mm^2 and I = 1 x 10^8 mm^4.

UNIT – V

10 A hollow rectangular column of external depth 1.5 m and external width 0.8 m is 12 cm thick. Calculate the maximum and minimum stress in the section of the column if a vertical load of 220 kN is acting with an eccentricity of 16 cm.

(OR)

11 A Simply supported beam of length 6 m carries a point load of 2.5 kN at a distance of 1 m from each end. If E = 2 x 10^5 N/mm^2 and I = 1 × 10^8 mm^4 for the beam, then using conjugate beam method determine: (i) slope at each end and under each load (ii) deflection under each load and at the centre.

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