Code: R7220106

R07

B.Tech II Year II Semester (R07) Supplementary Examinations December/January 2015/2016

STRUCTURAL ANALYSIS - I

(Civil Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 A propped cantilever ABCD is fixed at A and propped at C. The free end is at D. AB = BC = CD = 1m. It carries a uniformly distributed load of 8 kN/m intensity in the portion BD. Determine the prop reaction at C and also draw the shear force and bending moment diagrams indicating salient values. Also determine the location of point of contraflexure.

2 A fixed beam AB, 4.5 m long is carrying a central concentrated load of 25 kN. Calculate the end moments at supports A and B and also the deflection of the beam under the load. Assume the flexural rigidity of the beam as 6×10^{10} kN-mm^2.

3 A continuous beam ABCD is pinned at A and is simply supported at B and C. CD is the overhang portion. AB = 3 m, BC = 3.3 m and CD = 1.5 m. A uniformly distributed load of 16 kN/m intensity is acting on the whole span of the beam ABCD. The moment of inertia of AB is 2I and that for BC is 1.5I. Find the moments and reactions at all the supports and draw the bending moment and shear force diagrams using Clapeyron's theorem of three moments.

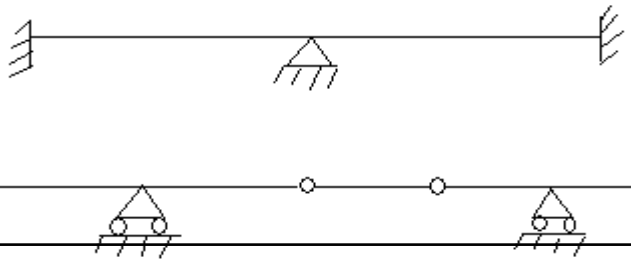
4 A two span continuous beam ABC rests on simple supports at A, B and C. All the three supports are at same level. The span AB = 6 m and span BC = 4 m. The span AB carries a uniformly distributed load of 50 kN/m and span BC carries a central point load of 60 kN. EI is constant for the whole beam. Find the moments and reactions at all the supports and draw the bending moment diagram using Slope-Deflection method.

5 A cantilever beam of 5 m span and circular cross-section of 100 mm diameter is carrying a uniformly distributed load of 10 kN/m on its whole length. Assume E = 215 GNm^{-2}. Determine the deflection at the free end using Castigliano's first theorem.

6 A load of 33 kN crosses a simply supported bridge of 21 m span. Find the values of maximum shear force and bending moment at sections 7 m and 12 m from the left end support. Also calculate the absolute maximum bending moment in the bridge.

7 A uniformly distributed load of 55 kN/m intensity and 20 m length crosses a simply supported girder of span 16 m. Draw influence lines for positive shear force, negative shear force and the bending moment at a section 8 m from the left end. Using the influence lines, calculate the maximum shear force and bending moment at 8 m from the left end support.

8 Determine the static and kinematic indeterminacies of the two beams shown in figures below.



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