Code: R7220106

R7

B.Tech II Year II Semester (R07) Supplementary Examinations, April/May 2013

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 A propped cantilever ABC of span 5.5 m is fixed at A and propped at the free end B. C is located at a distance of 2.5 m from the fixed end A. It carries a uniformly distributed load of 11 kN/m intensity in the portion CB of the span. Determine the prop reaction at B and also draw the shear force and bending moment diagrams indicating salient values.

2 A fixed beam AB of span 4.5 m is fixed at A and B. The beam carries a concentrated load of 22 kN at the mid span and also subjected to a UDL of 14 kN/m intensity on the left half of the span. Calculate the end moments at supports A and B and also draw the shear force and bending moment diagrams.

3 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 = 5 m and span BC = 4 m. The span AB carries a uniformly distributed load of 12 kN/m and span BC carries a central point load of 22 kN. EI is constant for the whole beam. Find the moments and reactions at all the supports and draw the bending moment diagram using Clapeyorn'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 = 4 m and span BC = 6 m. The span AB carries a uniformly distributed load of 55 kN/m and span BC carries a central point load of 63 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 simply supported beam is struck at its mid point by a weight of 1 kN falling freely from a height of 125 mm above the top of the beam. The beam is 4 m long and is of rectangular cross-section 150 mm × 250 mm. Determine the maximum central deflection of the beam using strain energy approach. Assume E = 205 GNm^{-2}.

Contd. in Page 2

Code: R7220106

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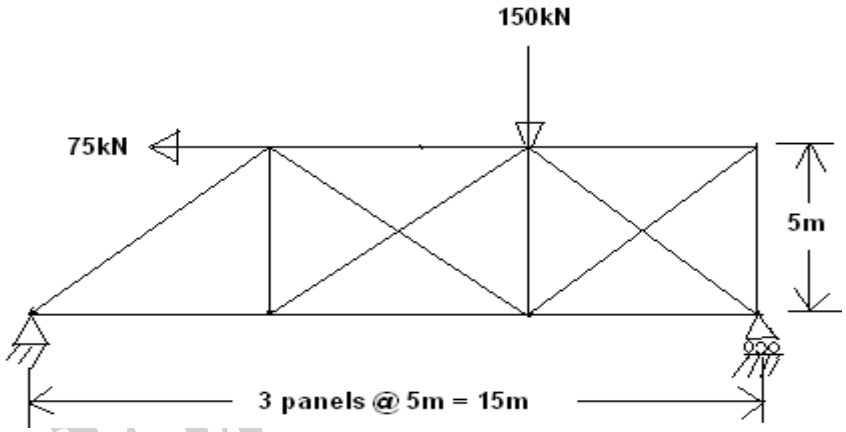
6 Two point loads of 12 kN and 17 kN, spaced 7 m apart cross a simply supported girder of 22 m span with the 12 kN leading from left to right. Calculate the maximum positive & negative shear force and maximum bending moment that can occur at a section 15 m from the left end support. Also find out the absolute maximum values of positive & negative shear force and bending moment over the span.

7 A load of 80 kN crosses a simply supported bridge of 21 m span. Draw influence lines for positive shear force, negative shear force and the bending moment at a section 11 m from the left end. Using the influence lines, find the values of maximum shear force and bending moment at section 11 m from the left end support.

8 Find the forces in all the members of the redundant pin jointed truss shown in figure. The ratio of length to the cross sectional area is same for all the members.



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