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Question Paper Code : 31006

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Fifth Semester

Civil Engineering

080100028 — STRUCTURAL ANALYSIS — I

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the principle of virtual work.

2. What is the use of Williot diagram?

3. What is meant by Influence lines?

4. State Muller Breslau's principle.

5. Distinguish between two hinged and three hinged arches.

6. State Eddy's theorem.

7. Write the limitation of slope deflection method.

8. How do you account for sway in slope – deflection method for portal frames?

9. Define Distribution factor.

10. What do you mean by carry over factor?

PART B — (5 × 16 = 80 marks)

11. (a) A truss shown in fig 1, is hinged at A and supported on rollers at B. Calculate the horizontal and vertical displacements of C, If E = 200 X 10^6 kN/m^2. All the members are 150×10^{-6} m^2 in section each.

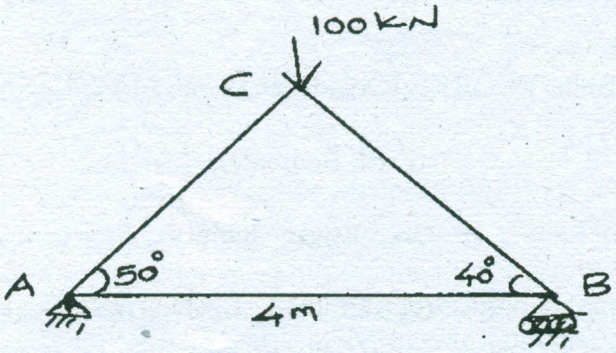

Fig. 1

Or

(b) Using the principle of virtual work. Determine the horizontal displacement of support D of the frame shown in Fig 2. The value of I are indicated along the member $E=200\times10^6$ kN/m^2, $I=150\times10^{-6}\,m^2$.

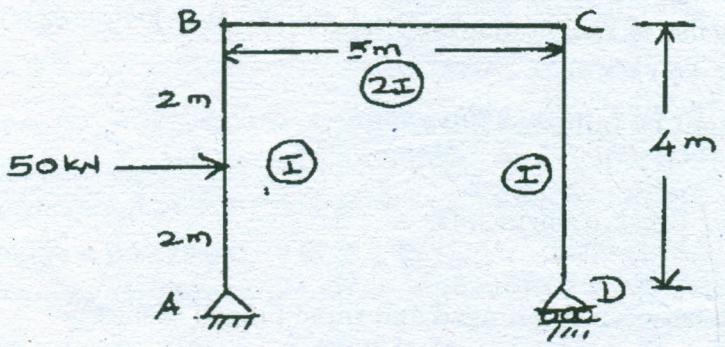

Fig. 2

12. (a) Four points load of 8 kN, 15 kN, 15 kN and 10 kN, 2 m between consecutive loads move on a girder of 30 m span. from left to right with the 10 kN load leading. Draw the influence line diagram for shear force and bending moment at 8 m from the left support and hence calculate the maximum shear force and bending moment at that section.

Or

(b) Using Muller Breslau's Principle, Draw the influence line for RA for continuous beam shown in Fig 3. Compute the ordinates at every 1 m interval. EI is constant throughout.

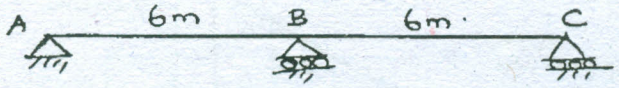

Fig. 3

13. (a) A parabolic 3 hinged arch carries a UDl of 30 kN/m on the left half of the span. It has a span of 16 m and a central rise of 3 m. Determine the resultant reactions at supports. Find the bending moment, normal thrust and radial shear at *xx*. 2 m from the left support.

Or

(b) A parabolic two hinged arch at the end has a span of 60 m and a rise of 12 m. A Concentrated load of 8 kN acts at 15 m from left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Calculate the net bending moment at the section.

14. (a) Analyse the continuous beam shown in fig 4, by slope deflection method and draw the bending moment diagram. EI is constant.

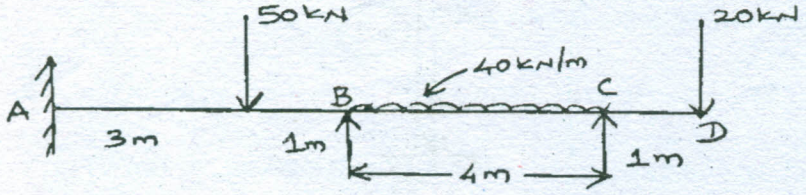

Fig. 4

Or

(b) Analyse the frame show in fig 5, by slope deflection method and draw the bending moment diagram.

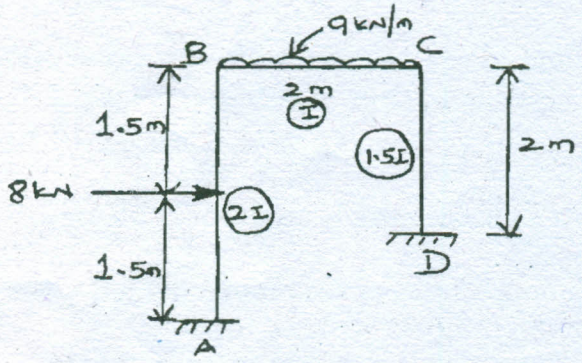

Fig. 5

15. (a) Analyse the continuous beam shown in fig 6 by moment distribution method and draw the bending moment diagram.

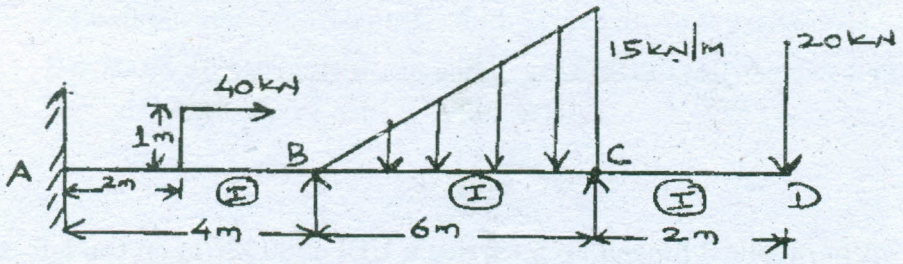

Fig. 6

Or

(b) Analyse the frame shown in fig. 7 by moment distribution method and draw the bending moment diagram.

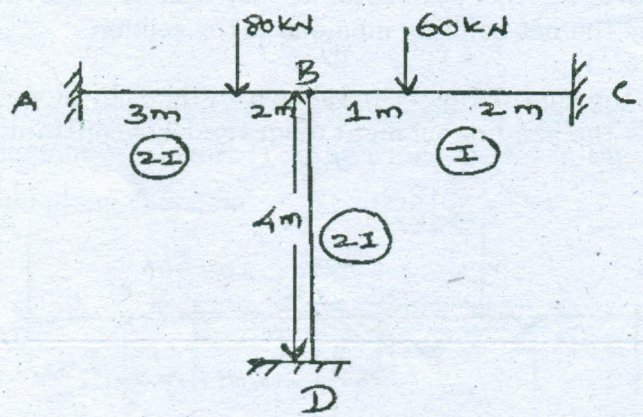

Fig. 7