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Question Paper Code : 21254

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Civil Engineering

CE 2302/CE 51/10111 CE 502 — STRUCTURAL ANALYSIS – I

(Regulations 2008/2010)

(Common to PTCE 2302/10111 CE 502 — Structural Analysis – I for B.E. (Part -Time) Third Semester – Civil Engineering – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State principle of virtual work.

2. What is a Williot diagram?

3. State Muller – Breslau's principle.

4. What are influence lines?

5. Mention the types of arches.

6. Give the applications of two hinged arches.

7. Write the basic slope deflection equations for a prismatic beam element.

8. Distinguish between 'Sway' type and 'Non-Sway' type problems. What difficulties arise while dealing with the former, compared to the later?

9. Explain the relative stiffness factor.

10. Explain the point of contra flexure.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the steps involved in the determination of deflections of pin-jointed plane frames and rigid plane frames.

Or

(b) Explain the concepts involved in the Williot diagram and its applications.

12. (a) The following system of wheel loads crosses a span 30 m.

Wheel load :	16	16	20	30	30 kN
Distance between centres :		3	3	5	5 m

Find the maximum value of BM and shear force in the span.

Or

(b) Determine the influence line for R_A, for the continuous beam shown in Fig Q. 12 (b). Compute the ordinates at every 1 m interval.

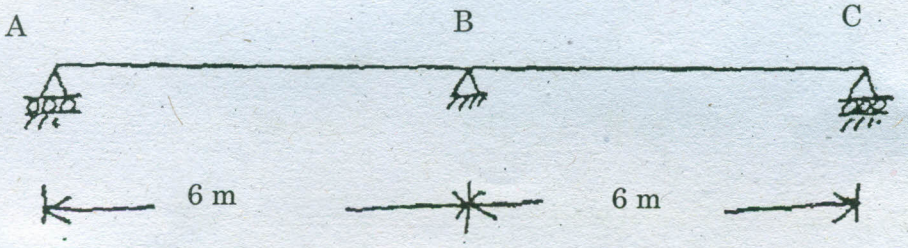

Fig. Q 12 (b)

13. (a) A two hinged parabolic arch has a span of 36 m and central rise 8 m carries a uniformly distributed load of 32 kN/m over the left half of the span. Determine the position and value of maximum bending moment. Also find the normal thrust and radial shear at the section. Assume that the moment of inertia at a section varies as secant of the inclination at the section.

Or

(b) A three hinged symmetric parabolic arch is of span 24 m with a central rise of 4 m. It carries a distributed load which varies uniformly from 30 kN/m at the crown to 60 kN/m at the springing. Calculate the normal thrust, shear force and bending moment at sections 3 metres and 6 metres from the left end hinge.

14. (a) Analyse the beam loaded as shown in Fig. 14 (a) by the slope deflection method and drawn the bending moment diagram and shear force diagram. EI is constant. (16)

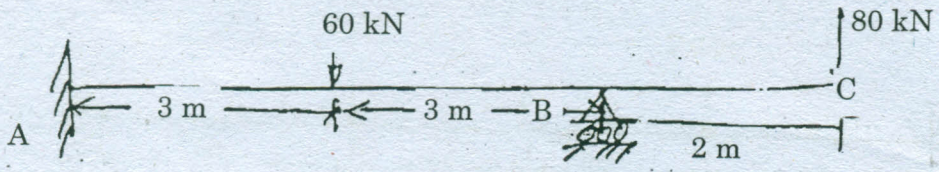

Fig. 14 (a)

Or

(b) Analyse the portal frame loaded in Fig. 14 (b) by the slope deflection method and sketch the bending moment and shear force diagrams. (16)

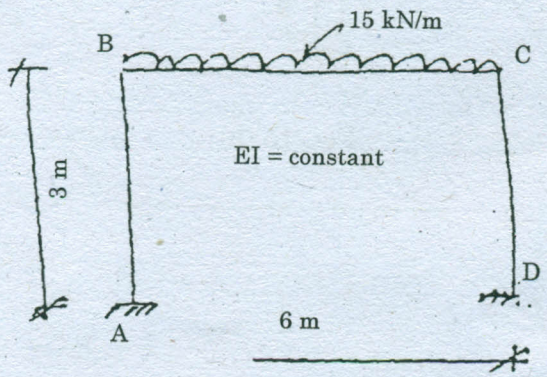

Fig. 14 (b)

15. (a) Analyse the continuous beam loaded as shown in Fig. 15 (a) by the method of moment distribution. Draw the bending moment and shear force diagrams.

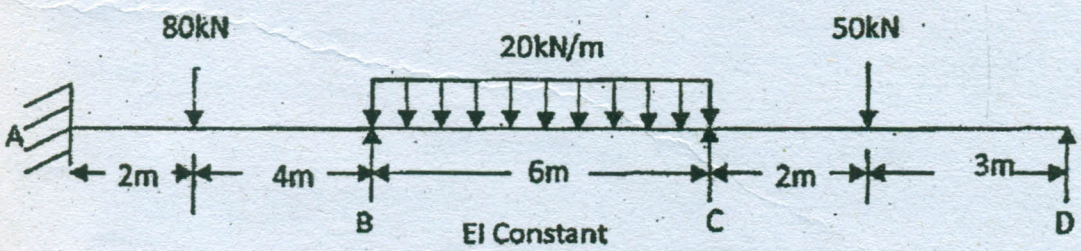

Fig. 15 (a)

Or

(b) Analyse the structure loaded as Fig 15. (b) by the using moment distribution method and draw the bending moment and shear force diagrams.

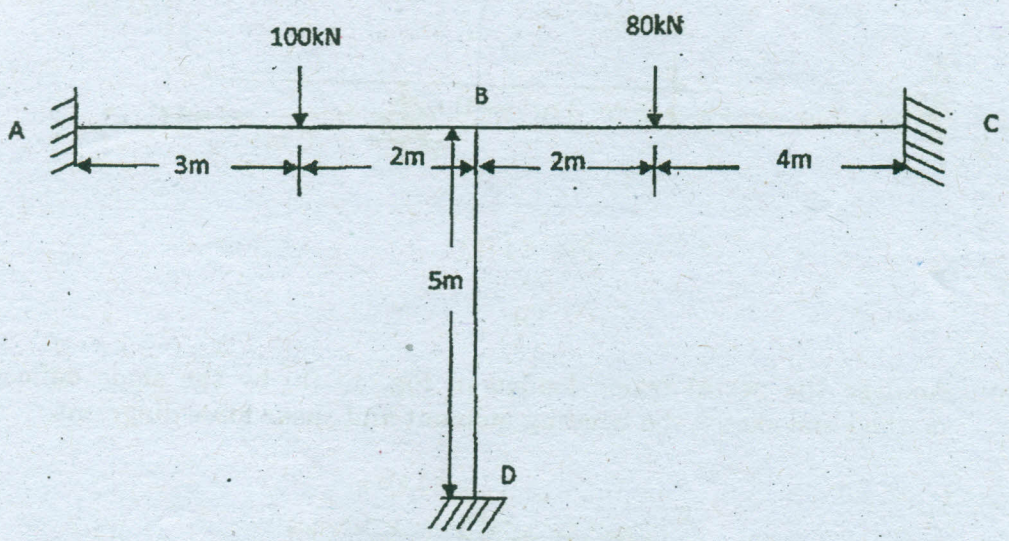

Fig. 15 (b)