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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CE303

Course Name: STRUCTURAL ANALYSIS -11

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Derive the equation for Clapeyron's three moment theorem considering unequal settlement of supports, different span lengths and different moment of inertia for adjacent spans. (10)

b) Brief the sway analysis procedure for analysis of portal frames using slope deflection method. (5)

2 The ends A and C of a two-span continuous beam ABC are fixed and B is provided with roller support. Span AB is 4m long and carries a UDL of 15kN/m. BC has a span of 2m and carries a concentrated load of 80kN at 1.5m from the fixed end C. Analyse the beam ABC by the theorem of three moments and plot the BMD and SFD. Assume EI constant. (15)

3 a) Set up the slope deflection equations for a beam considering support settlement. (3)

b) Using the slope deflection method, determine the moments at supports for the beam shown in Fig. 1 if the support B sinks by 10mm. Given I=1.32×10^8 mm^4 and E=2×10^5 N/mm^2. (12)

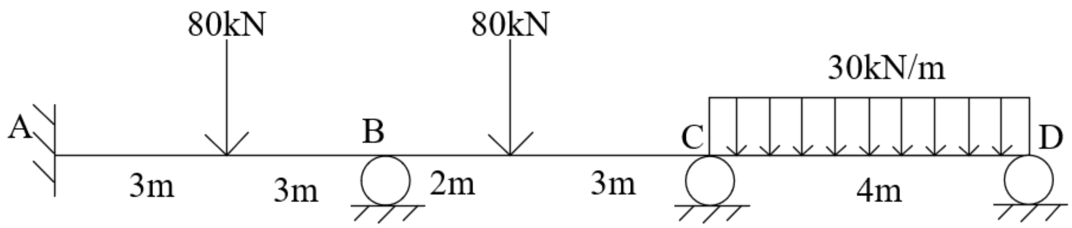

Fig. 1

PART B

Answer any two full questions, each carries 15 marks.

4 Analyse the rigid frame ABCD by moment distribution method. Ends A and D are fixed. AB and CD are vertical members with moment of inertia I and length 4m. The horizontal member BC with moment of inertia 2I is 6m long and acted upon by a concentrated load of 100kN at 2m from B. (15)

5 Analyse the three-span continuous beam ABCD by Kani's method and draw BMD and SFD. Left end support A is fixed and all other supports are roller supports. Span AB=6m, BC=5m and CD=4m. Span AB carries a central concentrated load of 80kN, BC carries a concentrated load of 80 kN at 2m from B and CD carries a UDL of 30kN/m. EI is constant. (15)

6 a) Determine the moments at A, B, C of frame shown in Fig. 2 using Kani's method and plot BMD. (7)

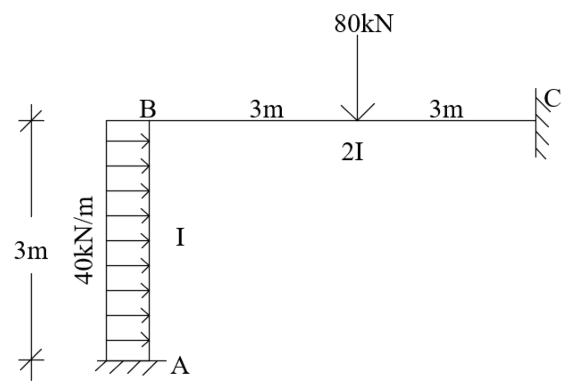

Fig. 2

b) Analyse the continuous beam shown in Fig. 3 by moment distribution method (8)

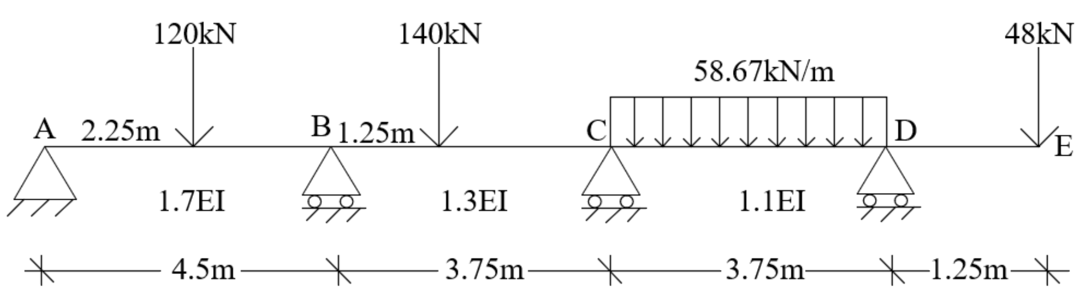

Fig. 3

PART C

Answer any two full questions, each carries 20 marks.

7 a) Determine the shape factor of T- Section with flange width 120 mm. Depth of web is 110 mm. Thickness of flange and web is 10 mm. If the value of yield stress is 250 N/mm^2, find the plastic moment capacity of the section (10)

b) Determine the deflection at free end of a beam in the shape of a quadrant of a circle in plan, fixed at one end and free at the other, with a point load at the free end. (10)

8 Derive the expressions for bending moment and twisting moment at any section in a circular ring beam supported by a no: of columns placed at regular intervals. (20)

9 Determine the value of collapse load for the portal frame shown in Fig 4. All the members have the same plastic moment of resistance. (20)

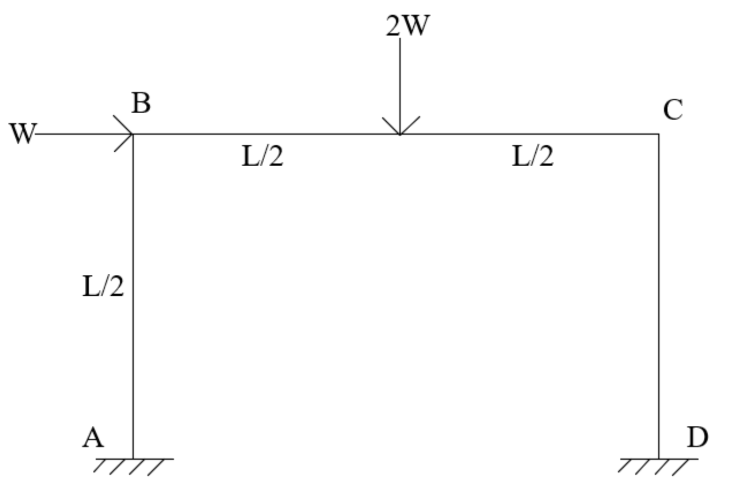

Fig 4

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