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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CE303

Course Name: STRUCTURAL ANALYSIS –II (CE)

Max. Marks: 100 Duration: 3 Hours

PART A

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

1 Derive the three-moment theorem equations for general loading. (15)

2 a) Analyse the continuous beam shown in Fig. 1, using three-moment theorem (Assume *EI* as constant throughout the beam). Draw BMD. (7)

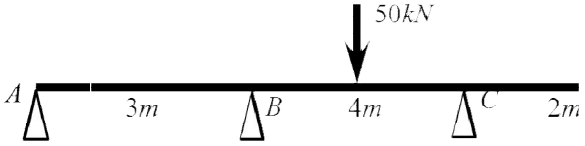

Fig. 1

b) Find the bending moments at B and C of the continuousbeam shown in Fig. 1,using slope deflection method (Assume *EI* as constant throughout the beam). (8)

3 Analyse the 2D frameshown in Fig. 2, using slope deflection method.Draw BMD.

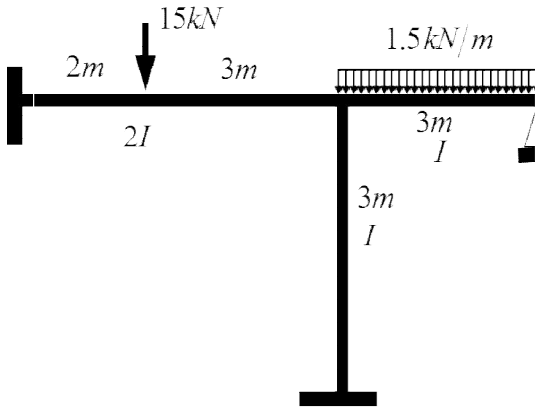

Fig. 2 (15)

PART B

Answer any two full questions, each carries 15 marks.

4 Analyse the 2D frameshown in Fig. 2, using moment distribution method.Draw BMD. (15)

5 a) Derive expressions for stiffness at the near-end and carry over factor for a beam (8)

with hinged far-end.

b) Differentiate between moment distribution method and Kani's method. (7)

6 Analyse the 2D frameshown in Fig. 3, using Kani's method.Draw BMD.

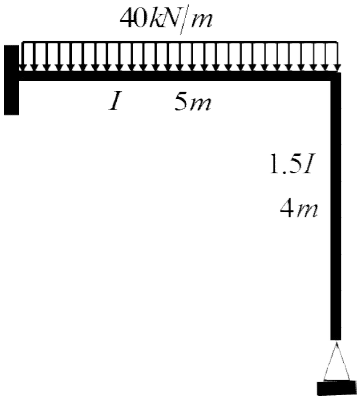

Fig.3 (15)

PART C

Answer any two full questions, each carries 20 marks.

7 Analyse and draw bending moment and twisting moment diagrams for a beam semi-circular in plan, and supported at three equally spaced hinges. The radius of the beam in plan is 3m, and it carries a UDL of 10kN/m. (20)

8 a) Derive expressions for shear force, bending moment and torsion of a beam with 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)

b) Find out shape factor for an isosceles triangular section of base ***b*** and height ***h.*** (10)

9 Find the plastic moment capacity required for the beam shown in Fig. 4. Assume uniform section throughout.

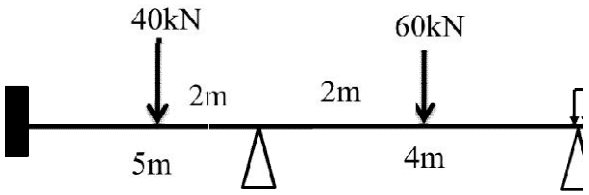

Fig. 4 (20)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CE303

Course Name: STRUCTURAL ANALYSIS -II

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks Marks

1 a) Explain the term static indeterminacy with two examples. (5)

b) Analyse the continuous beam shown in fig.1 by Three moment equation and draw the BMD and SFD. Given EI = 3200 kNm^2. (10)

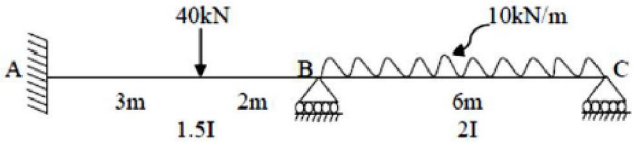

Fig.1

2 a) Explain how the effect of settlement of support is taken care of while analyzing the continues beams using slope deflection method. (5)

b) Analyse the continuous beam shown in fig.2 by slope deflection method and draw the BMD. (10)

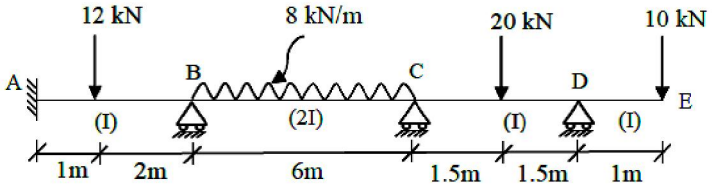

Fig.2

3 a) Derive the Clapeyron's theorem of three moments. (7)

b) Analyse the frame shown in fig.3 by slope deflection method and draw the BMD. Moment of inertia for all the members are same. EI = 3000 kNm^2. (8)

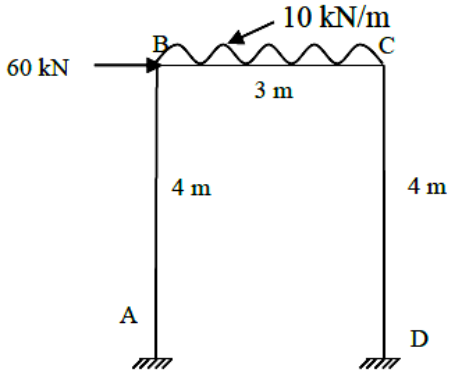

Fig.3

PART B

Answer any two full questions, each carries 15 marks

4 a) Define the following terms: (5)
i) Carry over moment ii) Carry over factor iii) distribution factor

b) Analyse the rigid frame shown in fig.4 by moment distribution method and draw the BMD. (10)

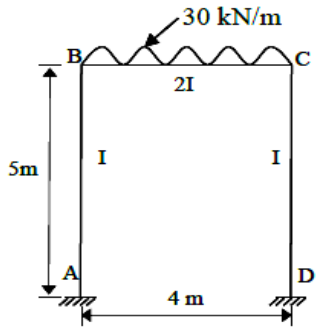

Fig.4

5 a) Differentiate between rotational factor and rotation contributions. (5)

b) Analyse the continuous beam shown in fig.5 by Kani's method and draw the BMD. (10)

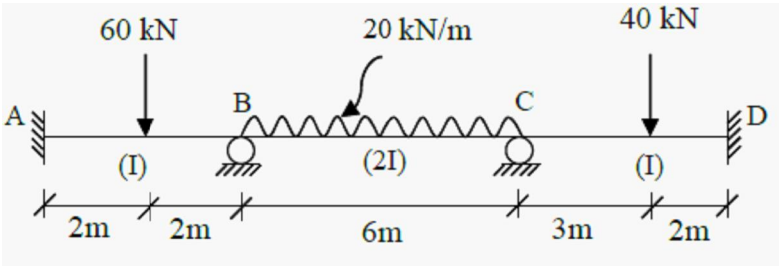

Fig.5

6 a) Describe the procedure for analysis of indeterminate structures by Kani's method. (5)

b) List out the situations that causes sway in portal frames with neat sketches. (4)

c) Explain the procedure to be followed for the analysis of rigid frames with sway by method of moment distribution. (6)

PART C

Answer any two full questions, each carries 20 marks

7 a) List out the circumstances where curved beams are provided. (4)

b) Discuss the different types of forces developed in a curved beam. (6)

c) Derive an expression for deflection at the free end of a quarter circle beam of radius R carrying a vertical load P at its free end. Sketch the shear force, bending moment and its torsional moment diagrams. Assume flexural rigidity (EI) = torsional rigidity (GJ). (10)

8 a) What are the assumptions made in theory of plastic analysis? (5)

b) Derive an expression for collapse load for a simply supported beam of span L carrying a concentrated load of W at centre by static and kinematic method. (5)

c) Calculate the plastic moment carrying capacity required for the continuous beam with the working loads as shown in fig.6. Take load factor =1.5 (10)

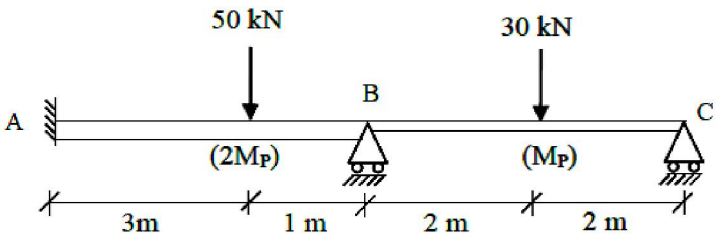

Fig.6

9 a) Define shape factor. Also derive the shape factor for a rectangular section with breadth 'b' and depth 'd'. (6)

b) Define the following terms: (4)
i) Load factor ii) Plastic modulus iii) Plastic hinge

c) A beam shown in fig.7 is semi-circular in plan supported on three equally spaced supports. The beam carries a uniformly distributed vertical load of w/unit of the circular length. Analyse the beam and sketch the bending moment and twisting moment diagrams. (10)

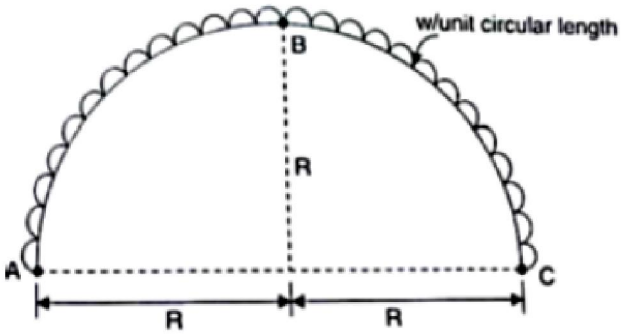

Fig.7

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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 Analyse the three-span continuous beam ABCD, with overhang DE, for the loading, end support conditions, spans and flexural rigidity as shown in Fig. 1, by applying the theorem of three moments. Draw the BMD and SFD. (15)

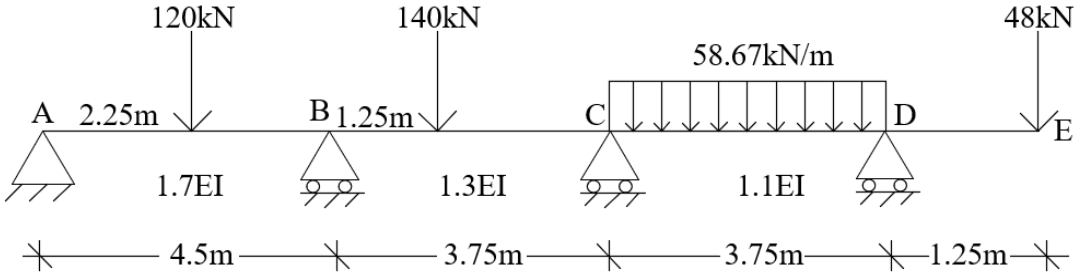

Fig. 1

2 a) Differentiate between force and displacement methods of analyses. Give one example for each case. (3)

b) Determine the moments at A, B and C using slope deflection method for the frame shown in Fig 2. Draw the BMD. (12)

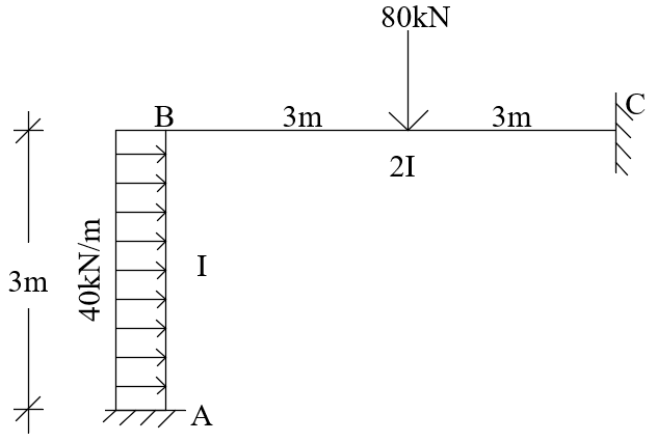

Fig. 2

3 a) What are the reasons for sway in frames? (4)

b) Set up the slope deflection equations for a beam considering support settlement. (4)

c) Write down the analysis procedure of a continuous beam ABC fixed at the ends A and C by three moment equation. Roller support is provided at B. Moment of inertia and span length of AB and BC are I_1, L_1 and I_2, L_2. Span AB carries UDL and span BC supports a central concentrated load. (7)

PART B

Answer any two full questions, each carries 15 marks.

4 Analyse the continuous beam shown in Fig. 1 by moment distribution method. Draw BMD and SFD (15)

5 Analyse the frame in Fig. 2 by Kani's method. Draw BMD. (15)

6 a) Formulate Kani's analysis procedure using a prismatic beam element AB having length l and flexural rigidity EI (10)

b) Differentiate distribution factor and rotation factor in structural analysis. (5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain the following terms. (8)
(i) Plastic hinge (ii) Load factor (iii) Shape factor (iv) Plastic Moment

b) Determine the shape factor of a circular section with diameter D. (6)

c) Locate the plastic hinges in a propped cantilever beam carrying UDL. (6)

8 a) Determine the collapse load for the fixed beam AB of span L. At point C, 0.2L distance from the left support A, there is a concentrated load of 1.25 W and another concentrated load of W is acting at point D which is 0.25L from the support B. The plastic moment of resistance of the beam is Mp. (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)

9 Determine the expression for bending moment and twisting moment for circular ring beam supported by a no: of columns placed at regular intervals. (20)

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