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10CV53

Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017

Structural Analysis – II

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Assume missing data suitably.**

PART – A

- 1 a. From the first principle, construct influence line diagrams for bending moment and shear force at section 'C' of a simply supported girder shown in Fig.Q1(a). (06 Marks)

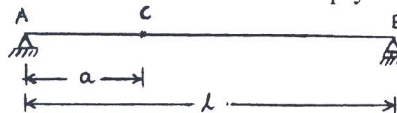


Fig.Q1(a)

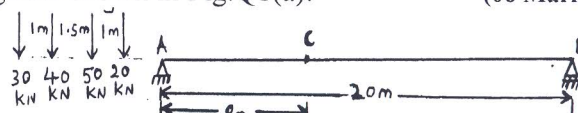


Fig.Q1(c)

- b. Explain the procedures to determine absolute maximum bending moment and absolute maximum shear force anywhere in a simply supported girder due to;
i) Series of moving concentrated loads and
ii) Moving uniformly distributed load, shorter than the span of the girder. (06 Marks)
- c. Obtain maximum bending moment and maximum shear force at section 'C' when a group of concentrated loads passes over the girder, shown in Fig.Q1(c). Use influence line diagram method. (08 Marks)

- 2 Analyze the continuous beam shown in Fig.Q2 by slope-deflection method. Draw bending moment and shear force diagrams and sketch elastic curve. (20 Marks)

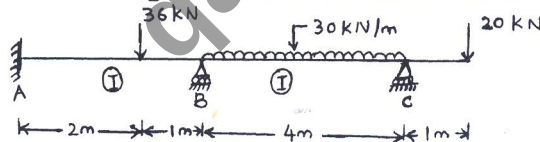


Fig.Q2

- 3 Analyze the continuous beam shown in Fig.Q3 by moment distribution method. Draw bending moment and shear force diagrams. (20 Marks)

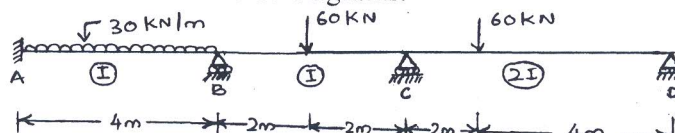


Fig.Q3

- 4 Analyze the portal frame shown in Fig.Q4 by slope-deflection method. Draw bending moment diagram. (20 Marks)

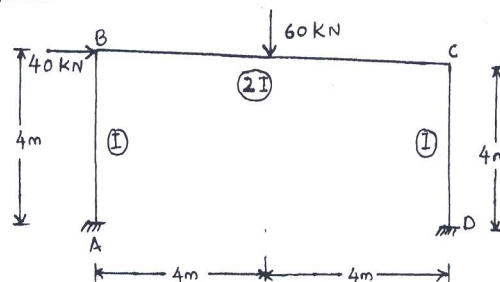


Fig.Q4

PART – B

- 5 Using Kani's method of rotation contribution, analyze the symmetric frame shown in Fig.Q5 and sketch bending moment diagram.

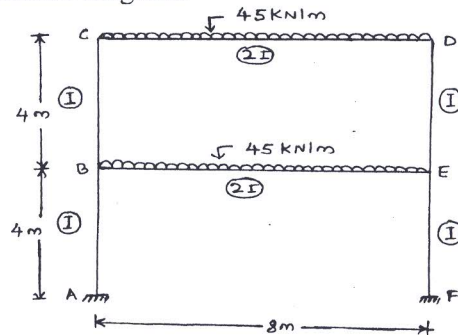


Fig.Q5

(20 Marks)

- 6 Analyze the continuous beam shown in Fig.Q6 by flexibility matrix method and sketch the bending moment diagram. Assume flexural rigidity to be constant throughout the beam.

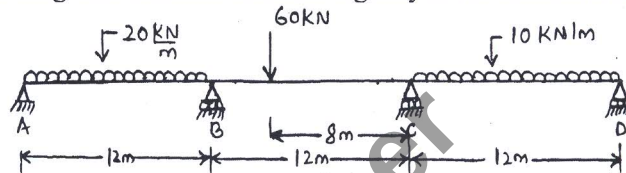


Fig.Q6

(20 Marks)

- 7 Using stiffness matrix method, analyze the frame shown in Fig.Q7. Draw bending moment diagram.

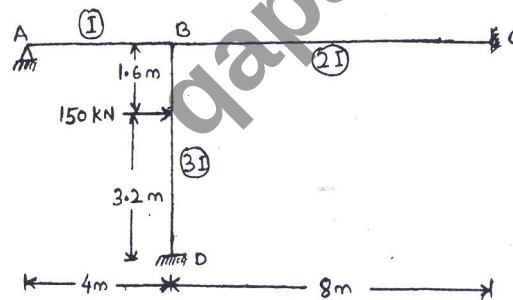


Fig.Q7

(20 Marks)

- 8 a. Explain the importance of inertial force, damping force, restoring force and exciting force in structural dynamics. (04 Marks)
- b. Explain the following in brief:
- Degree of freedom
 - Natural frequency
 - Period
 - Free undamped and damped vibrations. (06 Marks)
- c. Obtain natural frequencies for the structural systems shown in Fig.Q8(c)(i) and Fig.Q8(c)(ii). The cross-section of both the beams is rectangular of size 100 mm wide and 150 mm deep. Take Young's modulus $E = 2.1 \times 10^5$ MPa for the materials of the beam.

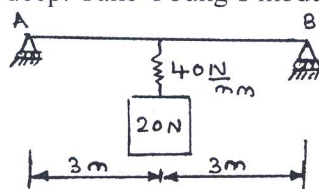


Fig.Q8(c)(i)

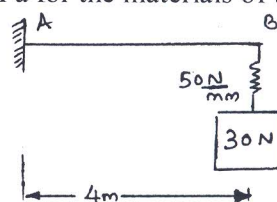


Fig.Q8(c)(ii)

(10 Marks)

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