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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)**

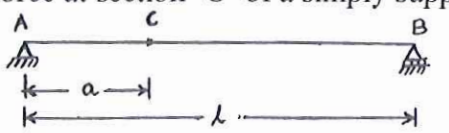

Fig.Q1(a)

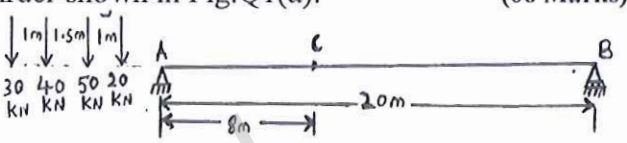

Fig.Q1(c)

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.

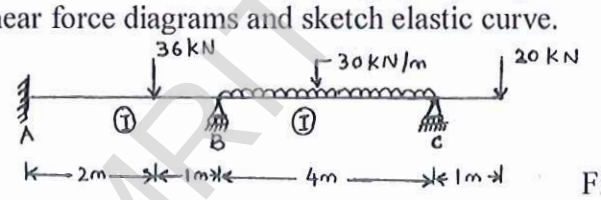

Fig.Q2 **(20 Marks)**

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

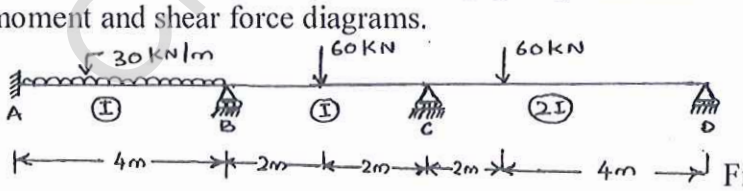

Fig.Q3 **(20 Marks)**

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

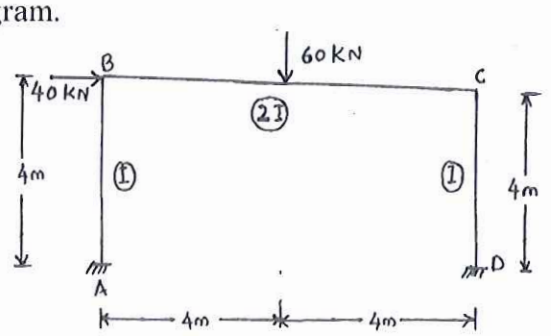

Fig.Q4 **(20 Marks)**

PART – B

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

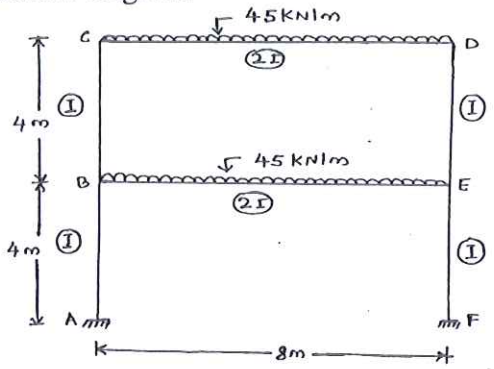

Fig.Q5 **(20 Marks)**

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.

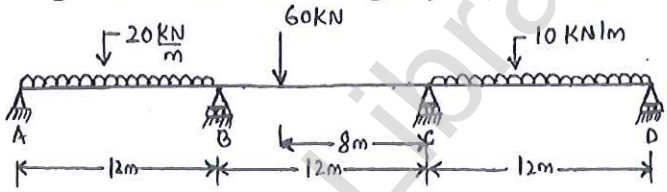

Fig.Q6 **(20 Marks)**

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

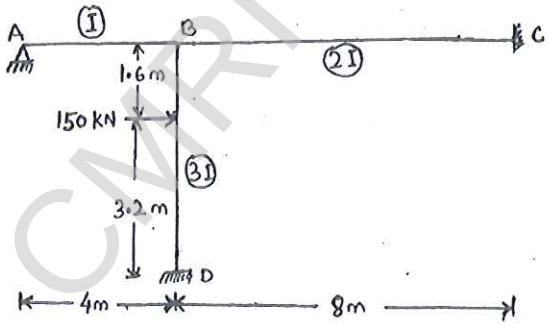

Fig.Q7 **(20 Marks)**

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:
i) Degree of freedom ii) Natural frequency
iii) Period iv) 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.

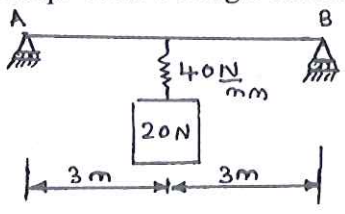

Fig.Q8(c)(i)

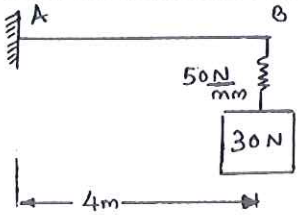

Fig.Q8(c)(ii)

(10 Marks)

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