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10CV53

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Structural Analysis – II

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Four point loads of 120 kN, 160 kN, 160 kN and 80 kN spaced 2 m between consecutive loads move on a girder of 25 m span from left to right with the 120 kN load leading. Calculate the maximum bending moment at a point 10 m from left support. Also, calculate the position and value of the absolute bending moment. **(10 Marks)**

b. Draw the ILD for shear force and bending moment for a section at 6 m from left support of a simply supported beam 15 m long. Hence calculate the maximum bending moment and shear force at the section due to a uniformly distributed rolling load of length 5 m and intensity 40 kN/m run. **(10 Marks)**

2 Analyse the frame shown in Fig. Q2 by slope deflection method. Draw SFD, BMD and elastic curve. Take EI constant. **(20 Marks)**

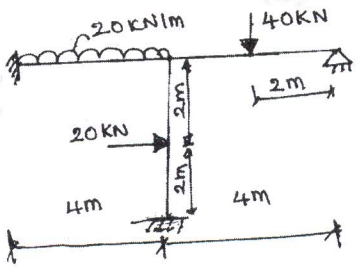

Fig. Q2

3 Analyse the continuous beam ABCD 20 m long simply supported at its ends and loaded as shown in Fig. Q3. If support B sinks by 10 mm, analyse the beam by moment distribution method. Sketch the SFD and BMD. Take $E = 2.1\times10^5$ N/mm^2 and $I = 85\times10^5$ mm^4. **(20 Marks)**

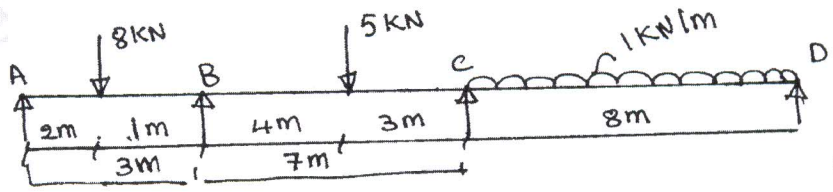

Fig. Q3

4 Analyse the frame shown in Fig. Q4 by moment distribution method. **(20 Marks)**

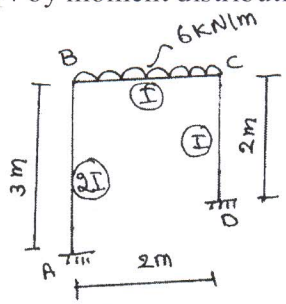

Fig. Q4

PART – B

5 Analyse the beam loaded as shown in Fig. Q5 using Kani's method. Draw BMD. **(20 Marks)**

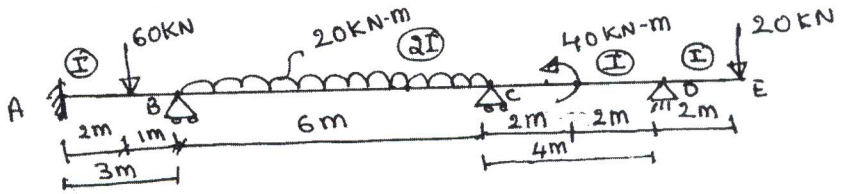

Fig. Q5

6 Analyse the portal frame ABCD shown in Fig. Q 6 by flexibility method. EI is constant throughout. **(20 Marks)**

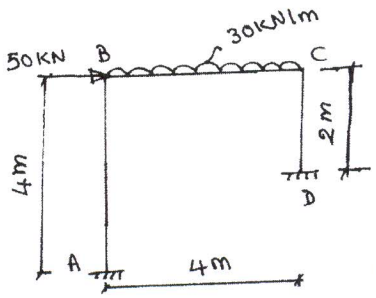

Fig. Q6

7 Analyse the frame shown in Fig. Q7 by stiffness matrix method. Draw BMD and elastic curve. **(20 Marks)**

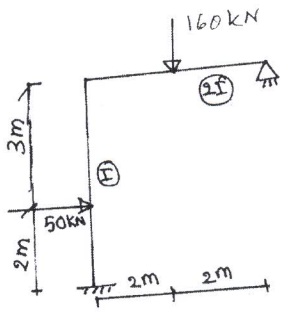

Fig. Q7

8 a. Explain the following:
i) Vibration and oscillation.
ii) Free vibration and forced vibration.
iii) Damping and types of damping.
iv) Degree of freedom and single degree of freedom system. **(12 Marks)**

b. Calculate the natural angular frequency in sideway for the frame in Fig. Q8 (b) and also the natural period of vibration. If the initial displacement is 25 mm and the initial velocity is 25 mm/s, what is the amplitude and displacement at t = 1 sec. **(08 Marks)**

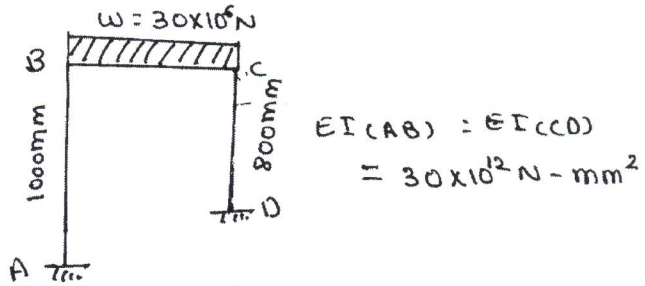

Fig. Q8 (b)

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