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10CV53

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Structural Analysis - II

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. For a simply supported beam shown in Fig Q1(a), construct the influence line for reaction at A (R_A), shear at X(F_x) and Bending moment at X(M_X). Calculate R_A, F_X and M_X due to four concentrated loads as shown in Fig Q1(a)

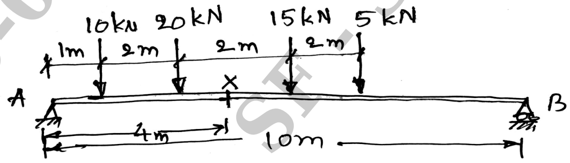

Fig Q1(a) **(10 Marks)**

b. The span of a simply supported bridge is 30m and is crossed from left to right by a train of six loads of magnitude 10, 15, 25, 15, 15 and 10kN leading load, and distance between them are 1.2m, 1m, 0.8m, 0.8m and 0.6m respectively. Calculate maximum Bending moment 10m from the left end. **(10 Marks)**

2 Analyze the continuous beam shown in Fig Q2. Using slope deflection method. Sketch BMD.

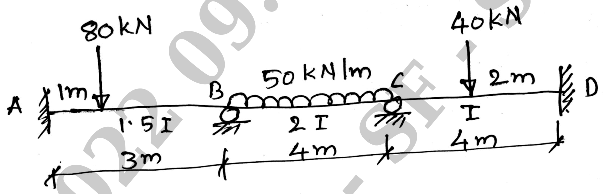

Fig Q2 **(20 Marks)**

3 Analyze the frame shown in Fig Q3, using Moment Distribution method. EI – constant sketch BMD.

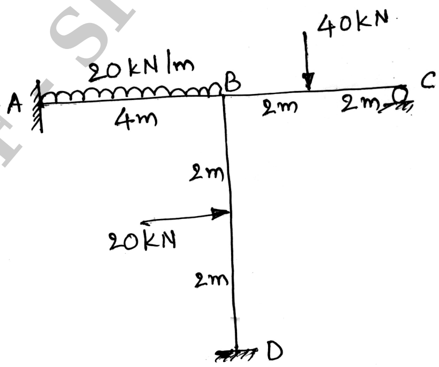

Fig Q3 **(20 Marks)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

4 Analyze the portal frame shown in Fig Q4, using Moment Distribution method. Sketch BMD.

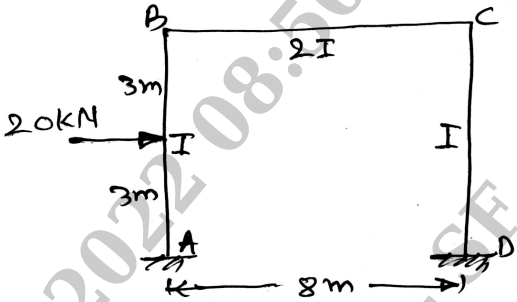

Fig Q4 **(20 Marks)**

PART – B

5 Analyze the frame shown in Fig Q5, for end moments taking advantages of symmetry of the frame and loading. Sketch BMD.

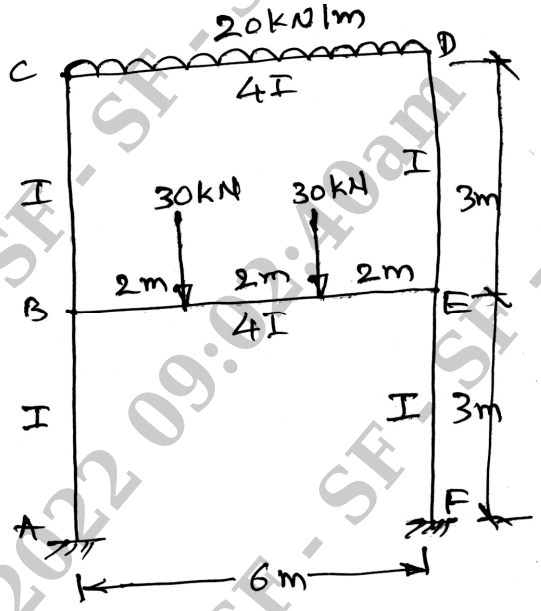

Fig Q5 **(20 Marks)**

6 Analyze the frame, shown in Fig Q6 by flexibility method. EI – constant. Sketch BMD.

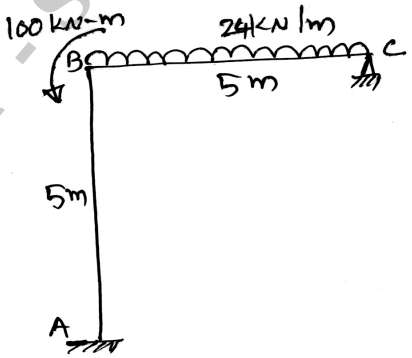

Fig Q6 **(20 Marks)**

7 Analyze the frame shown in Fig Q7 by stiffness method. Sketch BMD.

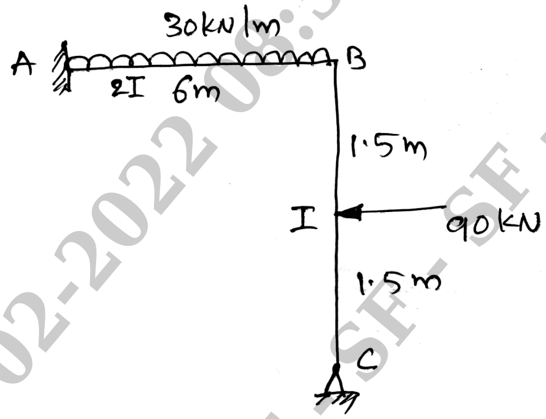

Fig Q7 **(20 Marks)**

8 a. Explain the following :

i) Degree of freedom
ii) Damping
iii) Free and Forced Vibration
iv) Natural Frequency
v) Single degree of freedom. **(10 Marks)**

b. Determine the natural frequency of the following system, shown in Fig Q8(b), Take $E = 2 \times 10^5$ MPa.

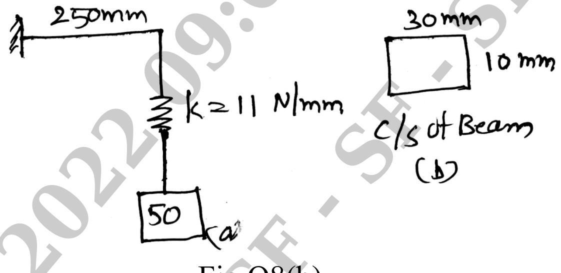

Fig Q8(b) **(10 Marks)**

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