U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 20CV5PCISA **Max Marks: 100**
Course: Indeterminate Structural Analysis **Date: 07.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 Analyse the rigid portal frame shown in Fig.Q.1 using slope deflection method. Also sketch bending moment diagram. Assume EI is constant. **20**

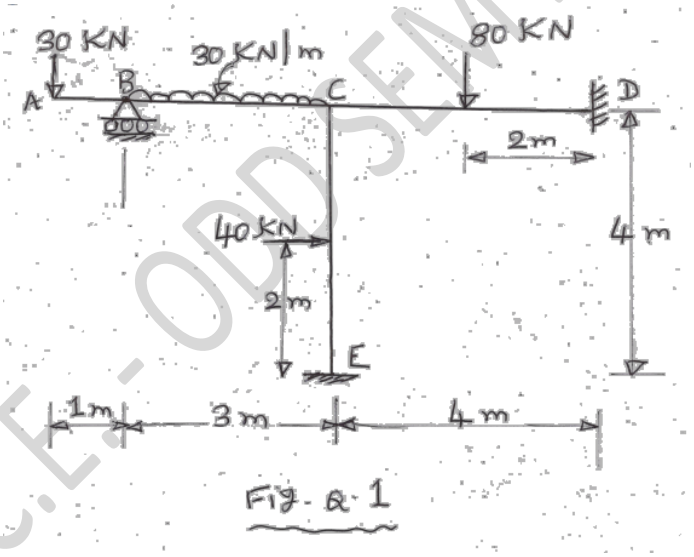

Fig. Q 1

UNIT - II

2 a) Explain the terms: stiffness factor, distribution factor and carry over factor. **06**

b) Analyse the continuous beam shown in Fig.Q.2 by moment distribution method. Support 'B' sinks by 10 mm. E=240.7 x 10^6 kN/m^2 I=41.62x10^{-6} m^4. Assume EI is constant. **14**

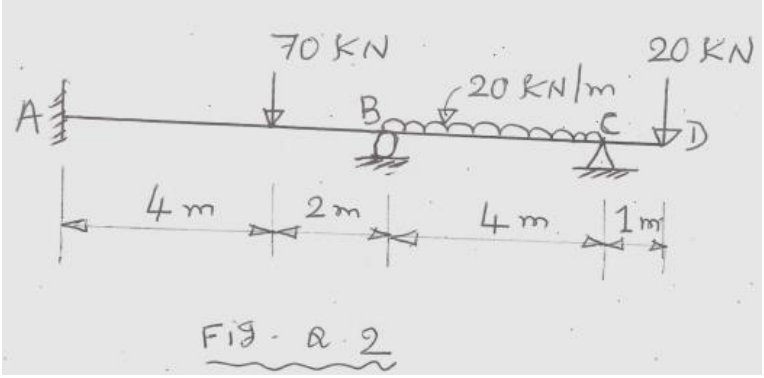

Fig. Q 2

UNIT - III

3 Analyse the rigid portal frame shown in Fig.Q.3 by Kani's method. Also draw BMD. Moment of inertia for columns is 2I and for beams is I. **20**

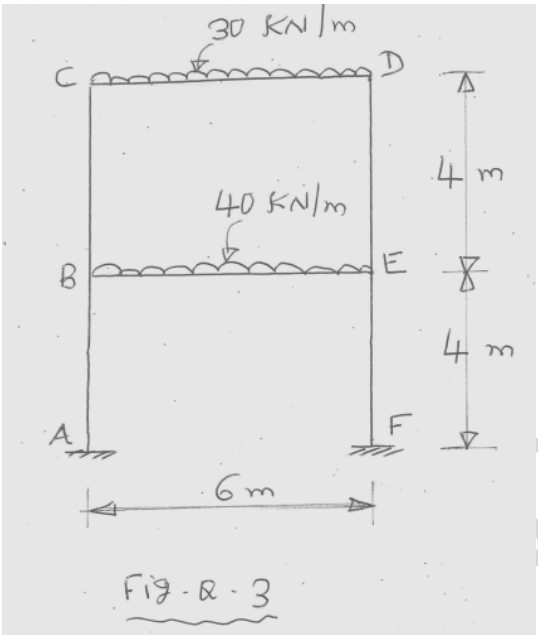

Fig.Q.3

UNIT - IV

4 A symmetrical two hinged parabolic arch of span 40 m and rise 5 m is subjected to an udl of 20 kN/m symmetrically placed in central 20m. The MI varies as the secant of the slope of the arch axis. Calculate BM, Normal thrust and Radial shear at left quarter span point. **20**

OR

5 Find the forces in all the members of the plane pin jointed truss shown in Fig.Q.5. The cross sectional area of all vertical members is 3000 mm^2 each, and for all other members is 2200 mm^2. E=2x10^5N/mm^2 **20**

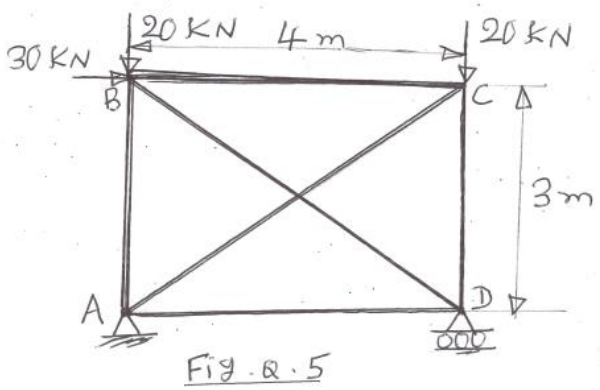

Fig.Q.5

UNIT - V

6 Draw the ILD for shear force and bending moment for a section at 5 m from the left hand support of a simply supported beam 20 m long. Hence calculate the maximum BM, maximum positive and negative SF at the section due to an uniformly distributed rolling load of length 8 m and intensity 10 kN/m run. **20**

OR

7 For a simply supported beam of span 25 m, compute by influence line principle, **20**

a) Maximum BM at 8 m from left support
b) Absolute Max BM
c) Maximum reaction

The series of concentrated loads to be taken as rolling load system is as shown in Fig.Q.7. It may be assumed that loads move from left to right with 110kN leading.

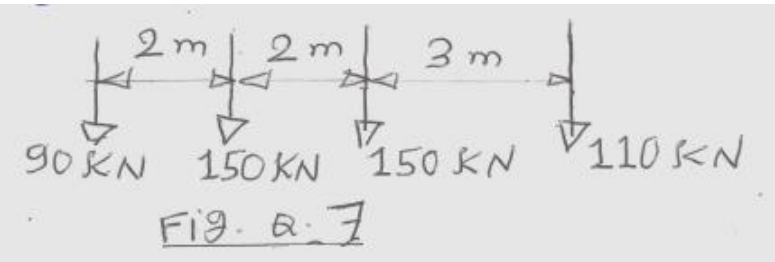

Fig. Q.7

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