U.S.N.										

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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

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

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 frame shown in Fig.1, by slope deflection method. Draw the bending moment diagram and elastic curve. **20**

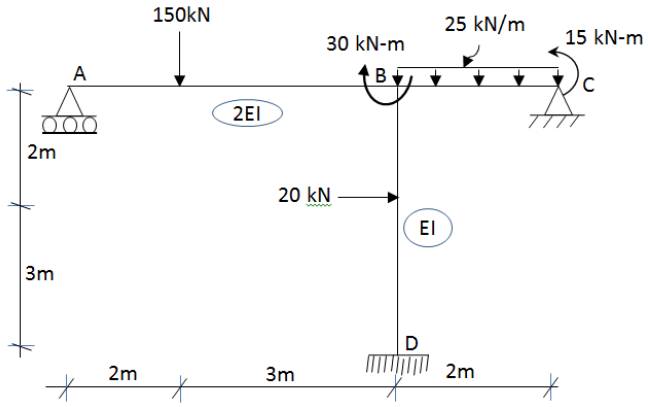
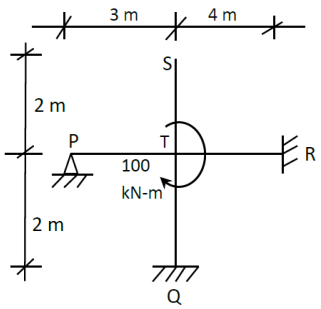


Fig. 1

UNIT - II

2 a) All members in the rigid-jointed grid frame shown are prismatic and have the same flexures stiffness (EI). Find the magnitude of the bending moment at R and Q (in kN-m) due to the moment at joint T. **05**



b) Analyse the beam shown in fig.2 by moment distribution method. Sketch its bending moment and elastic curve. Supports B and C sink down by 3 mm. Take EI = 4000 kN-m^2 **15**

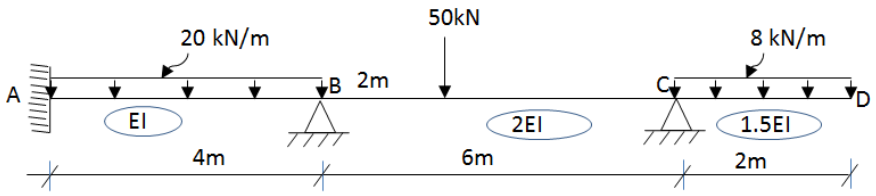


Fig. 2

UNIT - III

3 Analyze the frame shown in Fig. 3 by Kani's method and determine all the member end moments. Draw BMD and elastic curve. **20**

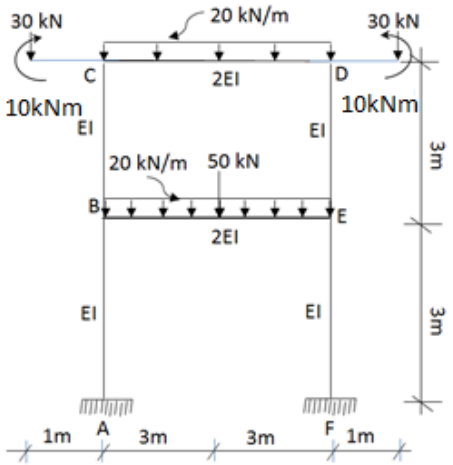


Fig. 3

UNIT - IV

4 A two hinged parabolic arch of span 30 m and central rise 4.0 m subjected to concentrated loads of 50 kN and 70 kN acting at a distance of 8 m and 12 m respectively from the left end. Determine the horizontal thrust, normal thrust and radial shear at a distance of 10m from the right end. Also find maximum positive and negative bending moments in the arch rib. Sketch the BMD. **20**

OR

5 Find the forces in all the members of the pin jointed truss shown in Fig. 4 by using strain energy method. All members have same sectional area and Young's modulus. **20**

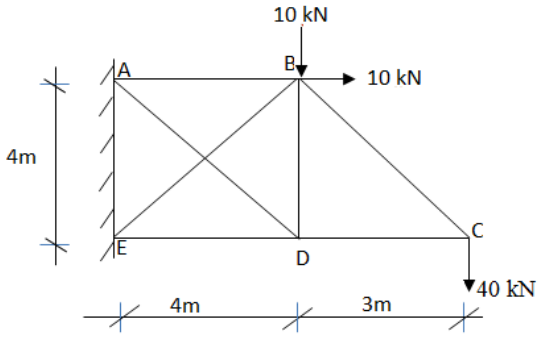


Fig. 4

UNIT - V

6 Find the value of absolute maximum bending moment and absolute maximum shear force, when a series of concentrated loads 75kN, 150kN, 150kN, 100kN, 100kN and 120kN spaced at 1m, 1.5m, 1.5m, 1.5m and 2m respectively crosses a simply supported girder of span 30m. Loads move from left to right with 120 kN load leading. **20**

OR

7 a) Obtain the condition for maximum bending moment at a section of a simply supported beam traversed by an udl shorter than the span. **10**

b) A Simply supported girder of span 25 m is traversed by a total distributed load of 180 kN spread over a length of 6m. Evaluate: **10**

i) Absolute maximum bending moment
ii) Absolute maximum shear force
iii) Maximum bending moment at a distance of 4m from left support.

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