Code No: G3502/R13

M. Tech. I Semester Supplementary Examinations, December-2016
MATRIX METHODS OF STRUCTURAL ANALYSIS
(Common to SE and SD)

**Time: 3 hours**   **Max. Marks: 60**

Answer any FIVE Questions
All Questions Carry Equal Marks

1. a   Explain about structural idealization
    b   Write about stiffness matrix for a 2 D beam element

2. a   List the properties of the stiffness matrix
    b   Why is the stiffness matrix method also called equilibrium method or displacement method

3.   Analyse the two-span continuous beam shown in Fig by any matrix method by stiffness and draw the bending moment diagram. Assume $EI = 27000$ kNm²
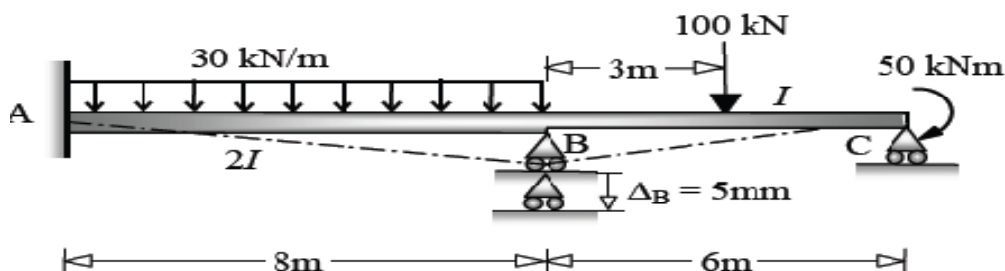
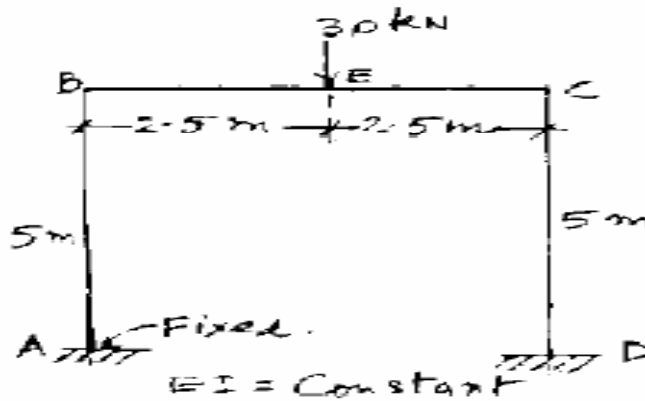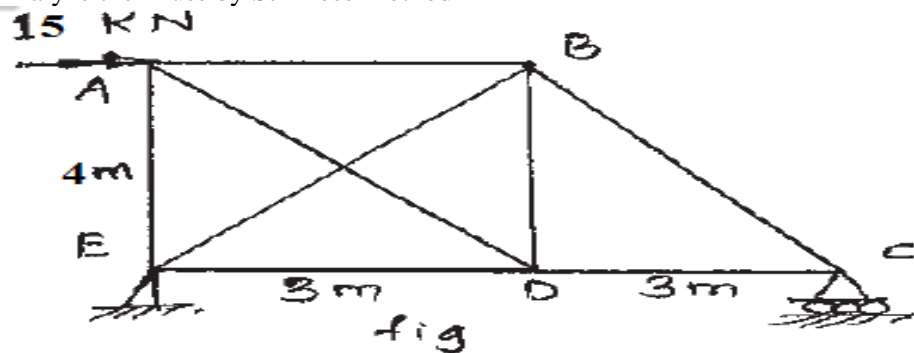4.   Analyze the truss by stiffness method


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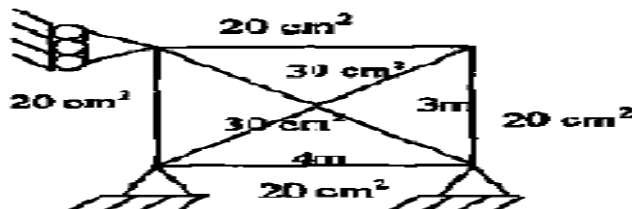
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5.   Analyze the portal frame ABCD shown in Fig by stiffness method and also draw the bending moment diagram

6.   Analyze the Truss by Stiffness Method

7.   Consider the symmetric grid system (plan view) shown in Fig, with all the elements subjected to uniformly distributed gravity loading of 12 kN/m and having uniform flexural rigidity $EI = 27000$ kNm^2 and torsional rigidity $GJ = 0.2EI$. Taking advantage of symmetry and adopting any method of your choice, find the deflection at the centre E and draw the bending moment diagram and probable deflected shape of a typical element AE.

Fig. 9
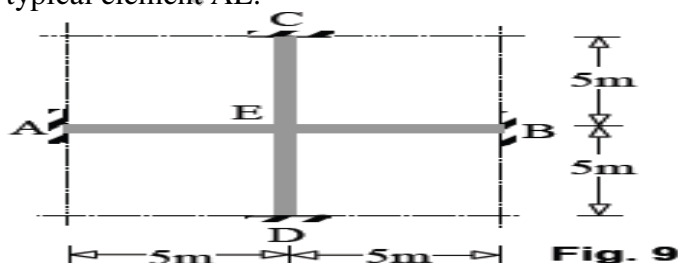
8   Solve the following equations by Gauss Elimination Method

$$2.5x_1 - x_2 + 2x_3 = 2.5$$

$$-6x_1 + 3x_2 + 3x_3 = 3$$

$$12_1 + 3x_2 = 18$$

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