

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014**

**Subject code: 711501****Date: 13-06-2014****Subject Name: Matrix Analysis of Framed Structures****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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|------------|---|-----------|
| <b>Q.1</b> | Analyze the beam shown in fig. 1 by stiffness member approach. Plot internal force diagrams                                 | <b>14</b> |
| <b>Q.2</b> | (a) Derive the transformation matrix for truss member.  | <b>07</b> |
|            | (b) Explain the nonlinear analysis in structural analysis with examples.  | <b>07</b> |
|            | <b>OR</b>   |           |
|            | (b) Derive the stiffness matrix for space frame member.   | <b>07</b> |
| <b>Q.3</b> | Analyze the beam shown in fig. 2 by flexibility member approach. Plot internal force diagrams                               | <b>14</b> |
|            | <b>OR</b>   |           |
| <b>Q.3</b> | Analyze the plane frame shown in fig. 3 by flexibility member approach. Plot bending moment diagram only.                   | <b>14</b> |
| <b>Q.4</b> | Analyze the grid structure shown in fig. 4 by stiffness member approach. Plot bending moment diagram.                       | <b>14</b> |
|            | <b>OR</b>   |           |
| <b>Q.4</b> | Analyze the plane frame shown in fig. 3 by stiffness member approach. Plot bending moment diagram.                          | <b>14</b> |
| <b>Q.5</b> | Analyze the truss shown in fig. 5 by stiffness member approach. Plot bending moment diagram only.                           | <b>14</b> |
|            | <b>OR</b>   |           |
| <b>Q.5</b> | Write the analysis steps for space truss shown in fig. 6 by stiffness member approach and find the global stiffness matrix. | <b>14</b> |

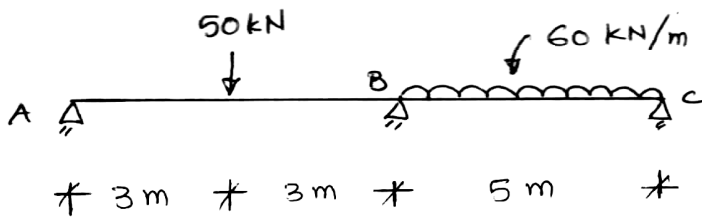


Fig. 1 (Q. 1)

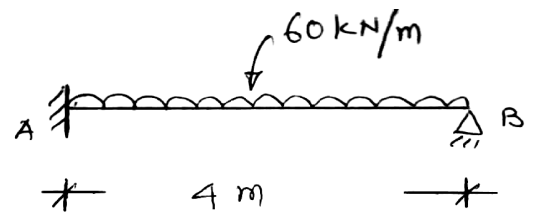


Fig. 2 (Q. 3 & 4)

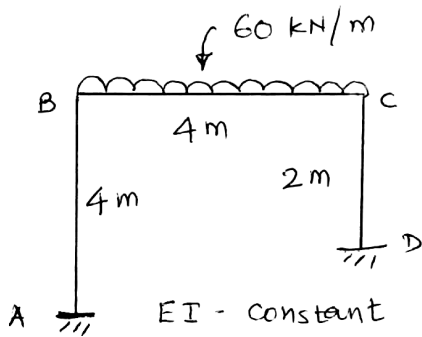


Fig. 3 (OR Q. 3 and  
OR Q. 4)

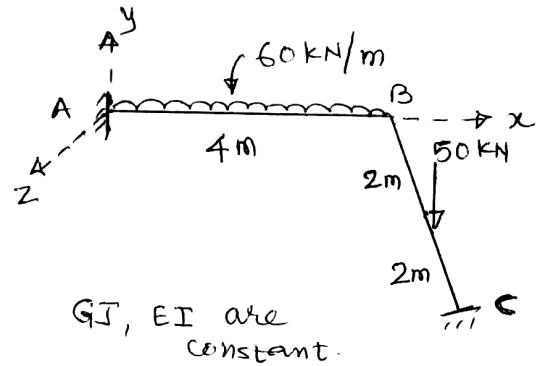


Fig. 4 (Q. 4)

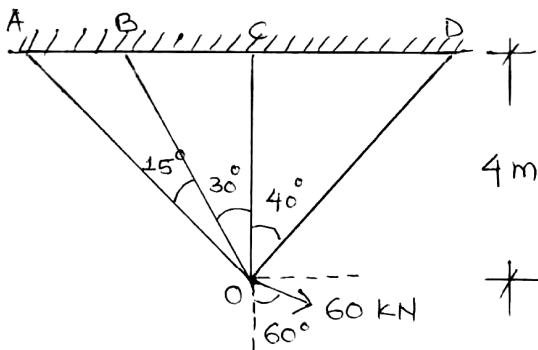


Fig. 5 (Q. 5)

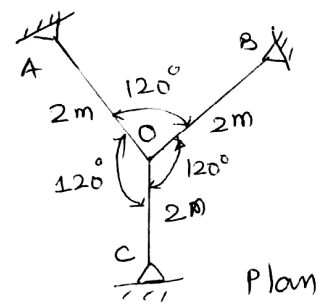
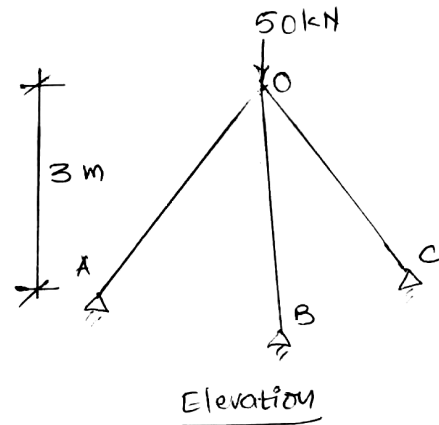


Fig. 6 (OR. Q. 5)

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