

**ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE**  
**B.E. / B.TECH. DEGREE EXAMINATIONS : NOV / DEC 2011**  
**REGULATIONS : 2008**  
**FIFTH SEMESTER : CIVIL ENGINEERING**  
**080100028 - STRUCTURAL ANALYSIS - I**

**Time : 3 Hours**

**Max. Marks : 100**

**PART - A**

**(10 x 2 = 20 Marks)**

**ANSWER ALL QUESTIONS**

1. What is the principle of virtual strain energy?
2. Write the equation for strain energy stored in terms of axial force P.
3. Give the uses of influence lines.
4. What is meant by Equivalent uniformly distributed load?
5. Give the value of BM of a three hinged arch subjected to UDL over its entire span.
6. What do you mean by theoretical arch?
7. Write the Eddy's theorem for arches.
8. Differentiate the Flexibility and Stiffness of the members..
9. List the classical methods of structural analysis.
10. Define Distribution factor.

**PART - B**

**(5 x 16 = 80 Marks)**

**ANSWER ALL QUESTIONS**

11. (a) A simply supported beam AB of length 8m is subjected to UDL of intensity 5kN/m for its whole length, find the slope at the support A. Use Dummy load method.

**(OR)**

11. (b) A cantilever AB of length 10m is subjected to point load of 8kN at its free end B and UDL of intensity 6kN/m for its half length from its support. Find the vertical deflection at 7m from free end.

12. (a) A UDL of load intensity 0.8kN/m of length 10m crosses a beam of 48 m. Find the maximum positive and negative shear force and max bending moment at 15m from the left end. Also find the absolute maximum bending moment.

**(OR)**

- (b) A series of concentrated loads of 12kN, 14kN, 26kN, 7kN & 10kN having 9m, 8m, 4m & 6m distances respectively apart between them and leading by 10kN load passes from left to right over the span of 42m. Find the maximum bending moment at section 13m from the left support.
13. (a) A circular arch rib of 24m span with a central rise of 4.8m is hinged at the crown and the springing which are at the same level. It carries a point load of 100kN at a distance of 7m from the left end. Calculate the support resultant reactions and draw the BMD.

**(OR)**

13. (b) A UDL of 40kN/m covers left half of the span of a two hinged parabolic arch, span 20 m and central rise 8 m. Determine the position and magnitude of max BM. Also evaluate the forces acting at a section 8m from left end. Assume M.I varies as secant of slope of the section.

14. (a) Analyse the continuous beam shown in figure 1, by slope deflection method and draw the SFD and BMD.  $EI$  is constant.

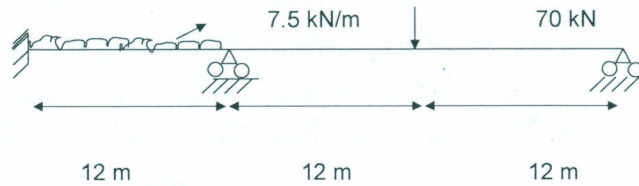


figure 1.

(OR)

- (b) Analyse the frame shown in figure 2, by slope deflection method and draw the BMD. Flexural rigidity is constant for all members.

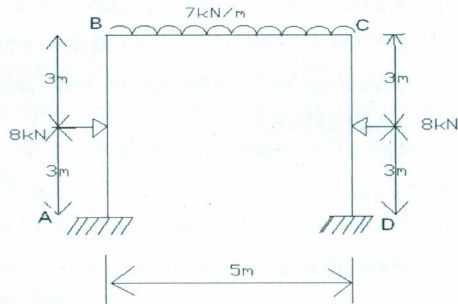


figure 2.

15. (a) Analyse the rigid frame shown in figure 3, by moment distribution method and draw the BMD.

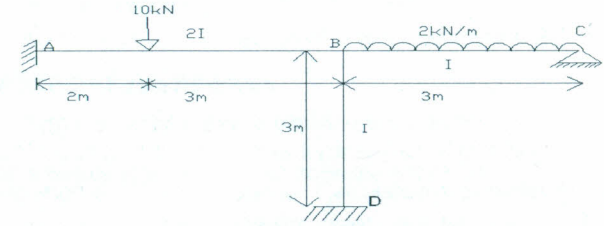


figure 3.

(OR)

- (b) Analyse the continuous beam, shown in figure 4, by moment distribution method. Draw B.M.D.

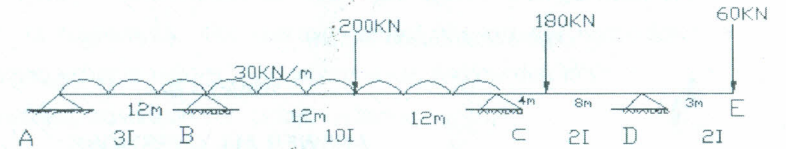


figure 4.

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