

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (Civil Engg.) III Year I-Semester Supplementary Examinations, May/June-2017**

**Theory of Structures - I**

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

**Part-A (10 × 2 = 20 Marks)**

1. Give one best example for kinematically determinate structure and kinematically indeterminate structure.
2. Explain unbalanced moment and carry over moment.
3. What are the basic assumptions made in development of slope deflection equation for a rigid frame?
4. In the slope deflection equations, the deformations are considered to be caused by  
 i) bending moment      ii) shear force      iii) axial force. The correct answer is  
 a) Only (i)      b) (i) and (ii)      c) (ii) and (iii)      d) (i), (ii), and (iii).
5. What is the fundamental distinction between simply supported and continuous structure.
6. Which of the following methods of structural analysis is a displacement method?  
 a) Moment distribution method      b) column analogy method  
 c) Three moment method      d) none of the above      e) all of the above
7. What is the advantage of Arch effect? The vertical intercept between the linear arch and actual arch indicate what?
8. When do you prefer approximate methods for analysis of structures?
9. A truss having four joints and six members and supported on hinges at its ends is a determinate truss (or) an externally indeterminate truss (or) an internally indeterminate truss (or) an indeterminate truss both internal and external. Which is the right answer?
10. State Castigliano's theorem-II.

**Part-B (5 × 10 = 50 Marks)**

11. a) A beam A B C D, 18 m long is continuous over three spans and is loaded as shown in Figure 1. Compute the moments and reactions at the supports. Use moment distribution method. [7]

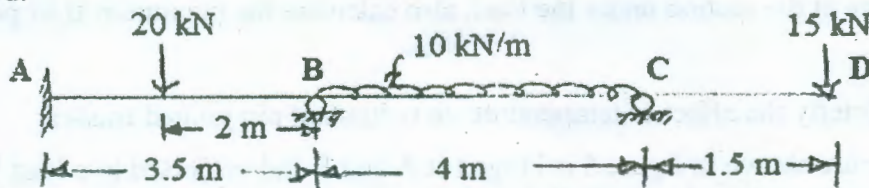


Fig. 1

- b) Write shear equation for the portal frame shown in figure 2. [3]

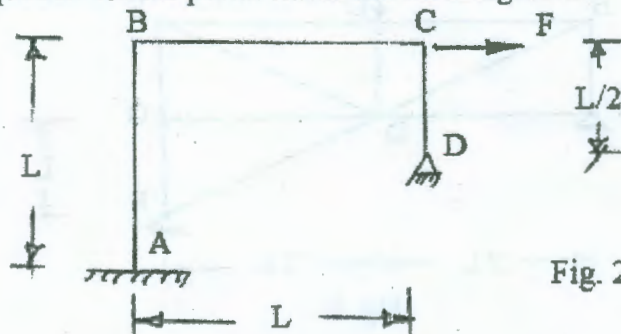


Fig. 2

12. a) Derive the slope deflection equations from fundamentals. [3]  
 b) Analyse the portal frame shown in figure 3 using slope-deflection method. Draw BMD. [7]  
 A hinge support is there at C to prevent sway.

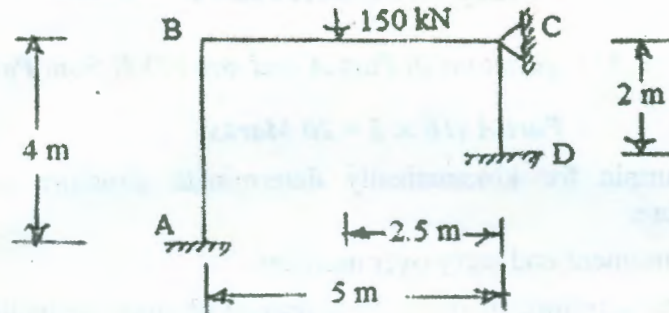


Fig. 3

13. a) Distinguish between rotation factor and displacement factor in Kani's method of analysis. [3]  
 b) Analyse the frame shown in figure 4 using Kani's method. [7]

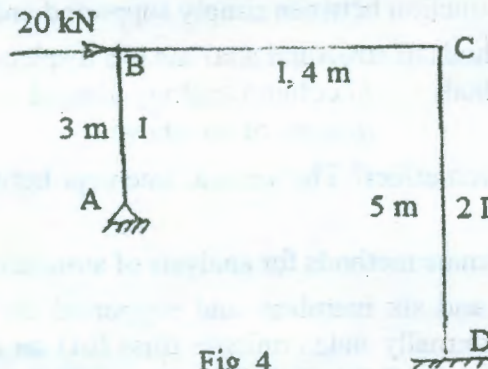


Fig. 4

14. a) A two hinged parabolic arch carries a uniformly distributed load of  $W$  per unit run on its left half of the span. If the span of the arch is  $L$  and its rise is  $h$ , determine the horizontal thrust at each support. [3]  
 b) A three hinged parabolic arch of 30 metre span and 6 m central rise carries a point load of 14 kN at 4 m horizontally from the left hand hinge. Calculate the normal thrust and shear force at the section under the load, also calculate the maximum B.M positive and negative [7]
15. a) Explain briefly the effect of temperature on redundant pin jointed trusses. [2]  
 b) The structure shown in figure 5 is hinged at A and F and subjected to a load  $W$  at C. Assuming the sectional area of all the members to be the same, analyse the frame. [8]

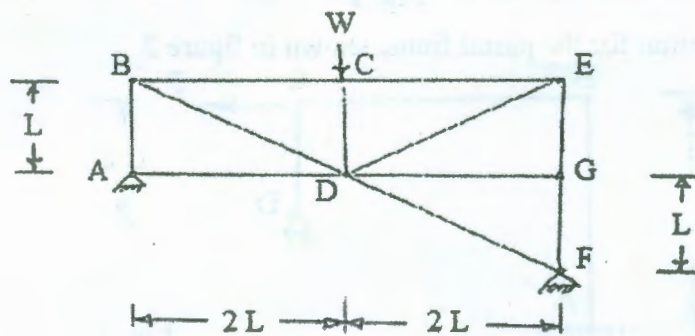


Fig. 5



- 16. a) For a fixed beam 'AB' of span 'L' subjected to a uniformly distributed load of  $w/m$  run, write the slope deflection equations. [4]
- b) Analyse the beam of span 4 m shown in figure 6 using moment distribution method and draw moment and shear diagrams. [6]

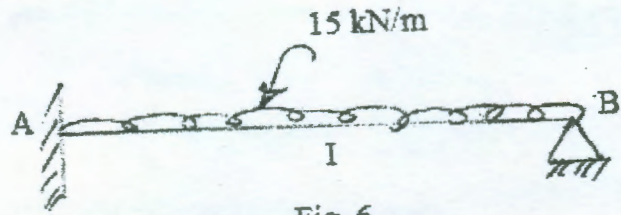


Fig. 6

- 17. Answer any *two* of the following: [5]
- a) Cantilever Method. [5]
- b) What are the advantages of Kani's method over moment distribution method? Also write the limitations of Kani's method. [5]
- c) What is unit load method? Explain. [5]

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