Hall Ticket Number:

Code No. : 31023

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E.(Civil Engg.) III Year I-Semester Main & Backlog Examinations, December-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. Define static indeterminacy and give an example for static indeterminacy equal to one.
2. Which kinematic indeterminacy is ignored /neglected in moment distribution method.
3. What are the advantages of slope deflection method over moment distribution method?
4. Is slope-deflection method a force or displacement method? Explain.
5. Define rotation and displacement factors.
6. State the advantages of Kani's method over other methods of analysis.
7. List the internal forces at any section of an arch and mark them on a sketch of the arch.
8. When do you use approximate methods of analysis?
9. State Castigliano's theorem-I.
10. What is the effect of temperature rise in a redundant pin jointed structure?

Part-B (5 × 10 =50 Marks)

11. a) Find the static and kinematic indeterminacies of a propped cantilever beam. [3]

    b) Draw bending moment diagrams for the continuous beam ABCD in Fig 1. Use moment-distribution method for analysis. [7]

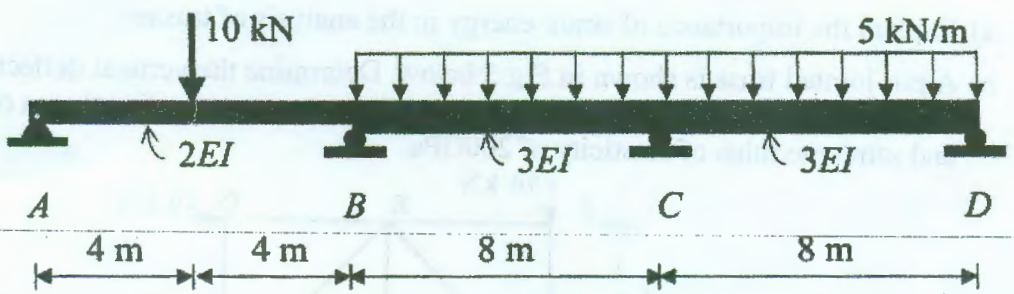

Fig. 1

12. a) What are the causes for side sway in portal frames? [3]

    b) Draw bending moment diagram for the frame in the following Fig:2. use slope-deflection method for analysis. [7]

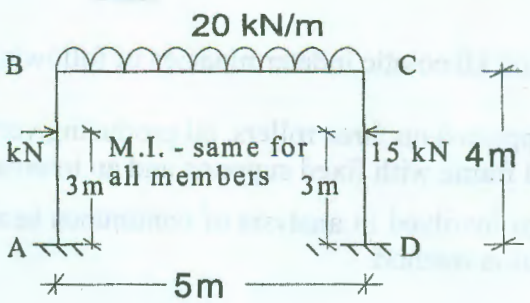

Fig. 2

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13. a) Determine displacement factors for the frame in the following Fig:3: [3]

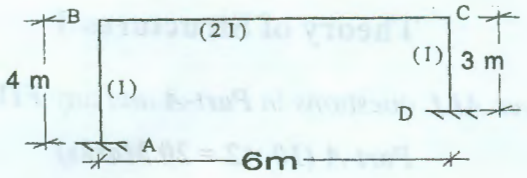

Fig.3

b) Analyse the frame shown in Fig: 4 by Kani's method and find support reactions. [7]

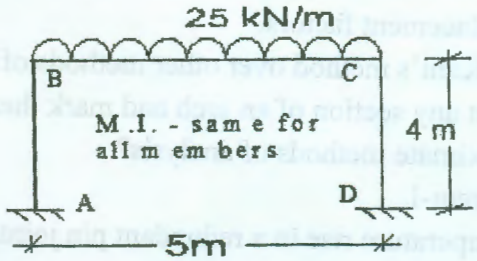

Fig.4

14. a) Differentiate two hinged and three hinged arches. [3]

b) A three-hinged parabolic arch, of span 18m and rise 3m, carries a uniformly distributed load of 30kN/m over left 6m. Find bending moment, normal reaction and radial shear at 4m from left support. [7]

15. a) Explain the importance of strain energy in the analysis of trusses. [3]

b) A pin-jointed truss is shown in Fig:5 below. Determine the vertical deflection of joint E by using unit load method. All members have same cross-sectional area of 300 sq.mm. and same modulus of elasticity of 200GPa. [7]

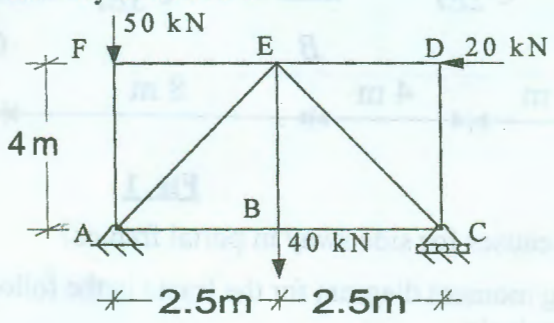

Fig.5

16. a) Find static and kinematic indeterminacies of following structures: [4]

(i) Beam supported on three rollers, all producing vertical reactions.
(ii) A portal frame with fixed supports and an internal hinge.

b) Explain steps involved in analysis of continuous beam with sinking of supports using slope deflection method. [6]

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17. Answer any ***two*** of the following:

a) Using Kani's method, analyse the frame shown in the Fig:6 and draw bending moment diagram. [5]

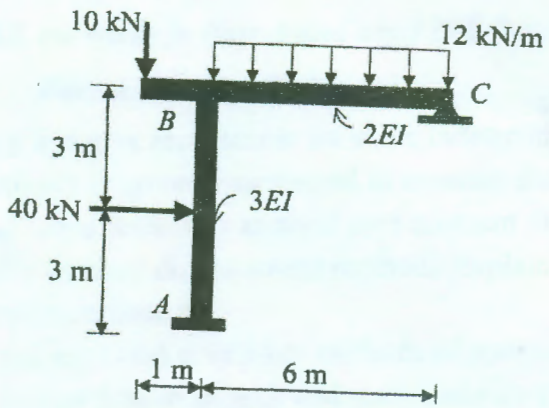

Fig.6

b) Explain the procedure of portal method of analysis. [5]

c) Describe in detail the principle in performing analysis of indeterminate trusses. [5]

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