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Code No. : 16135 AS

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Civil Engg.) VI-Semester Advanced Supplementary Examinations, August-2022**Advanced Structural Analysis**

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B****Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Define Influence line diagram.	2	1	1	2
2.	Draw influence line diagram for Bending Moment at a distance 4 m. from the left support of a simply supported beam of span 12m.	2	1	1	2
3.	A Pratt truss of height 5 m and having six panels with width of each panel as 5m. is subjected to uniformly distributed live load of 20 kN/m. Find maximum force in top chord member of second panel.	2	2	2	2
4.	A three hinged arch of span 36 m. and height 6 m. is subjected to a moving load of 16kN. Find the maximum height of the influence line diagram for horizontal reaction.	2	2	2	2
5.	The flexibility matrix of a member is (1 -3 -3 1) mm/N. Find the corresponding stiffness matrix.	2	1	3	2
6.	What do you mean by cross stiffness coefficients?	2	1	3	2
7.	Write the local stiffness matrix of a truss element having a length of L, cross-sectional area A and Modulus of Elasticity E.	2	1	4	2
8.	What do you understand by local coordinate system and global coordinate system?	2	1	4	2
9.	How many displacements are possible at each end of a beam element and name those displacements.	2	1	5	2
10.	What is a displacement transformation matrix?	2	1	5	2
Part-B (5 × 8 = 40 Marks)					
11. a)	A UDL of 30kN/m and of length 6 m. is allowed roll on simply supported girder of span 24 m. Find the maximum bending moment at a section 10 m. from the left support.	3	2	1	2
b)	The following system of wheel loads rolls over a simply supported beam of span 36 m.	5	3	1	2
	Calculate the maximum bending moment at 16m from left support.				
12. a)	Describe the significance of ILDs for trusses.	3	2	2	2

Contd... 2

- b) A through type Pratt truss has 6 panels of 4m each. **Compute** the force in the bottom chord member of second panel due to a moving load of 20 kN/m of length more than span. Take height of the truss as 3 m. 5 3 2 2
13. a) Distinguish between flexibility method and stiffness method of analysis. 3 2 3 2
- b) Analyse the continuous beam shown in Fig.1 using flexibility method and draw BMD. 5 3 3 2

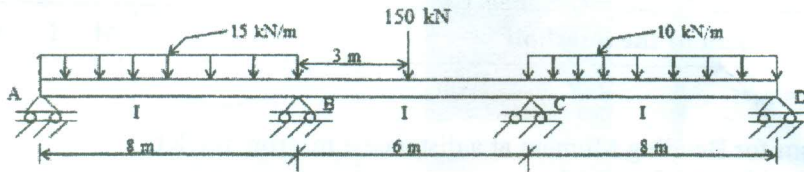


Fig.1

14. a) For the truss shown in Fig.2 find the direction cosines λ_x and λ_y for the member of the structure. 3 2 4 2

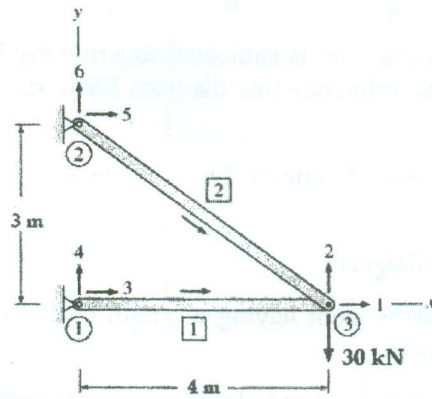


Fig.2

- b) Perform analysis of the truss shown in Fig.2 using direct stiffness method to find force in member 1. 5 3 4 2
15. a) For the continuous beam shown in Fig.3 write member stiffness matrix for element 1. Take EI as constant. 3 2 5 2

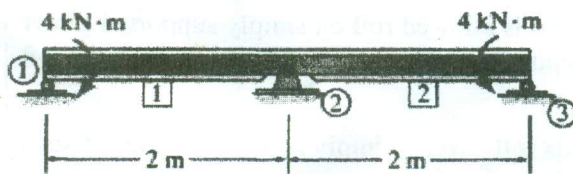


Fig.3

- b) Determine the support reactions of the beam shown in Fig.4 using direct stiffness method. Take EI as constant. 5 3 5 2

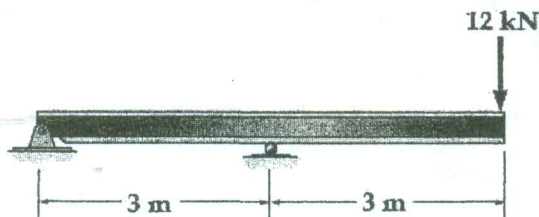


Fig.4

16. a)	How do you calculate absolute maximum bending moment for a simply supported beam subjected to a series of wheel loads?	4	2	1	2
b)	Write step-by-step procedure to find forces in members of a truss using influence line diagrams.	4	3	2	2
17.	Answer any <i>two</i> of the following:				
a)	Analyse the continuous beam shown in Fig.5 using stiffness method and draw BMD.	4	3	3	2
Fig.5					
b)	Write the structure stiffness matrix for the truss shown in Fig.6. Take AE as constant.	4	3	4	2
Fig.6					
c)	Write step-by-step procedure to perform analysis of a plane frame using direct stiffness method.	4	2	5	2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%
