Hall Ticket Number:

Code No. : 16112

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

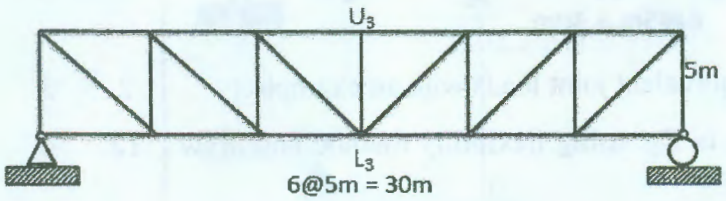
B.E. (Civil Engg. : CBCS) VI-Semester Main Examinations, January-2021

Theory of Structures-II

Time: **2** hours Max. Marks: **60**

*Note: Answer any **NINE** questions in **Part-A** and any **THREE** from **Part-B***

Part-A (9 × 2 = 18 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	A simply supported beam of span 10m carries two point loads 10kN and 20 kN at distance of 2m and 7 m from the left hand support. Find the shear force at the centre of the span using influence line diagrams.	2	3	1	2
2.	The absolute maximum bending moment in a simply supported girder of span 10 m due to an udl greater than the span is 100 kN-m. What is the intensity of the udl?	2	4	1	2
3.	In case of a three hinged parabolic arch of span 40m and rise 4m draw the influence line diagram for horizontal thrust and hence find the maximum horizontal thrust due to a moving point load of 50kN.	2	2	2	2
4.	For the through type bridge girder shown in fig. find the maximum force in the member U_3L_3 due to a moving load of 100kN using influence line diagrams. 	2	3	2	2
5.	Derive the flexibility coefficient matrix for a propped cantilever beam of span L and flexural rigidity EI, considering the prop reaction as the redundant, if it carries a udl of magnitude w per unit run over the entire span.	2	3	3	2
6.	Define stiffness coefficient? What is the relationship between flexibility coefficient and stiffness coefficient?	2	1	3	2
7.	Develop the transformation matrix for a 2-D truss element.	2	3	4	2
8.	Write the stiffness matrix for a truss element in local coordinates.	2	1	4	2
9.	Distinguish between beam elements with one degree freedom per node with beam element with two degree freedom per node with reference to their usage.	2	2	5	2
10.	Write the stiffness matrix of plane frame element.	2	1	5	2
11.	For a cantilever beam of span L draw the influence line diagrams for support reactions.	2	3	1	2
12.	Explain deck type and through type bridges.	2	2	2	2

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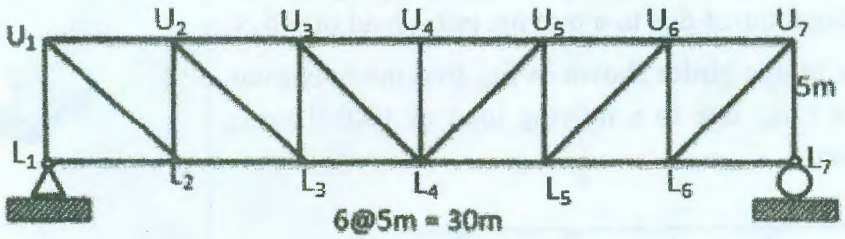
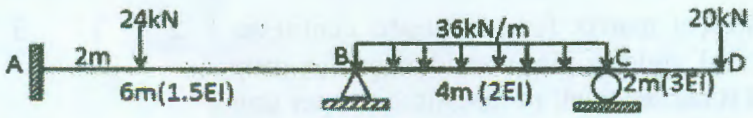
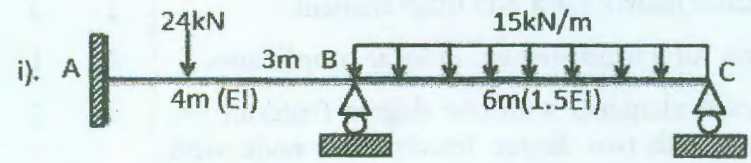
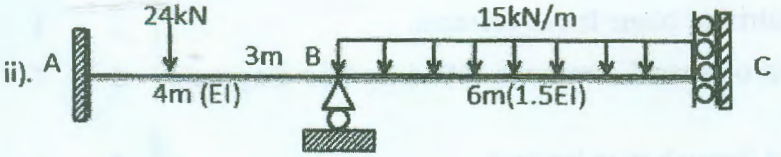
	Part-B (3 × 14 = 42 Marks)				
13. a)	A series of wheel loads 40kN, 60kN, 30kN and 50kN equi-spaced at 2m interval are allowed roll on a simply supported beam of span 10m. Determine the maximum shear force and maximum bending moment at a section 7m. from the left support.	7	5	1	2
b)	An udl of magnitude 10kN/m and of length 6m, cross a simply girder of span 12m. Find the maximum bending moment and shear force at a section 4m from the left support, and also find absolute maximum bending moment anywhere in the girder.	7	4	1	2
14. a)	Explain when counter bracing is provided in truss girder of a truss bridge.	2	2	2	2
b)	For the truss shown in fig. draw the influence line diagrams for forces in the members U_3U_4, U_3L_4, L_3L_4 AND U_3L_3 of the Pratt truss shown in fig. Find the maximum forces in these members due to a dead load of 10kN/m and a live load of 15kN/m longer than the span. 	12	4	2	2
15. a)	Explain joint loads and equivalent joint loads with an example.	2	2	3	2
b)	Analyse the beam shown in fig. using flexibility method and draw the bending moment diagram. 	12	4	3	2
16. a)	For the beams shown in fig. find the static and kinematic indeterminacy.  	4	4	4	2

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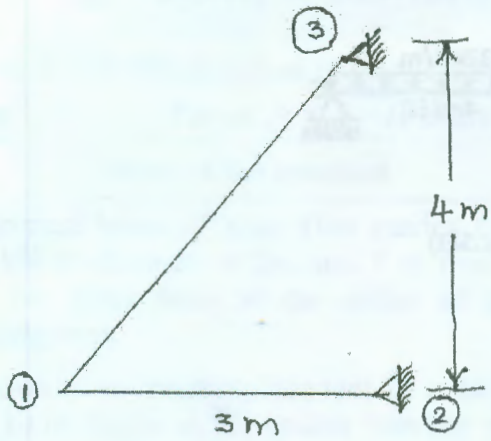
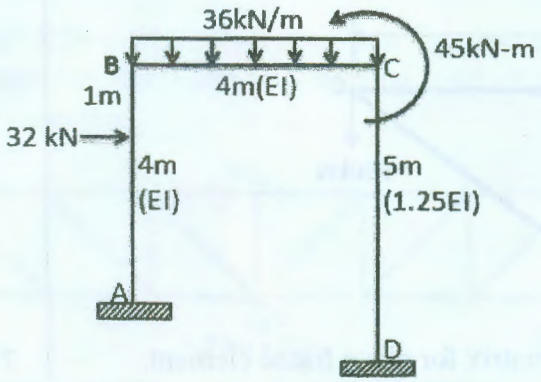
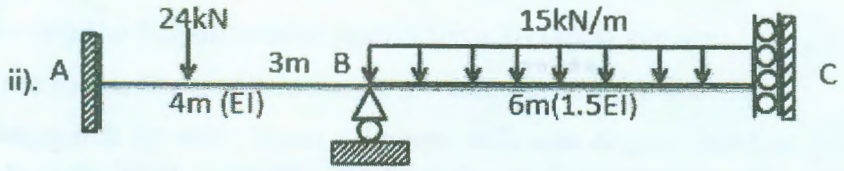
b)	For the truss shown figure, Develop the structure stiffness matrix. Take AE as constant. 	10	3	4	2
17. a)	For the frame shown in fig. develop the load vector and displacement vector with usual notations. 	4	4	5	2
b)	Analyse the beam shown in fig. and draw the bending moment diagram. 	10	4	5	2
18. a)	What do you understand by Equivalent uniformly distributed live load (EUDLL).	2	4	1	2
b)	Two point loads 20kN and 10kN spaced at 4m apart cross a simply supported girder of span 12m with 10kN load leading from left right. Sketch the maximum shear force and bending moment diagrams. Also determine the absolute maximum BM.	12	4	1	2

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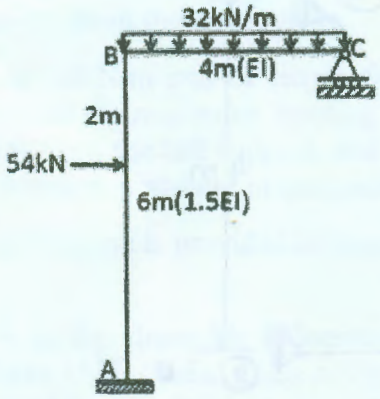
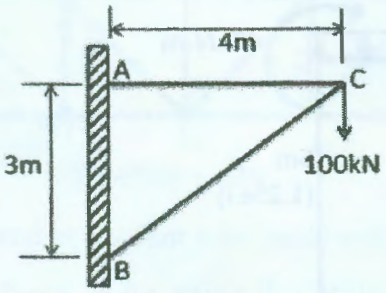
19.	Answer any ***two*** of the following:				
a)	Analyse the frame shown in fig. using flexibility method and draw the axial force diagram.  	7	4	3	2
b)	Find the forces in the members of the truss shown in fig. Assume AE is same for both the members. A= 1000 sq.mm and E= 2×10^5 MPa.  	7	4	4	2
c)	Develop the element stiffness matrix for plane frame element.	7	4	5	2

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

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	26.7
2	Knowledge on application and analysis (Level-3 & 4)	73.3
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	0

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