BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

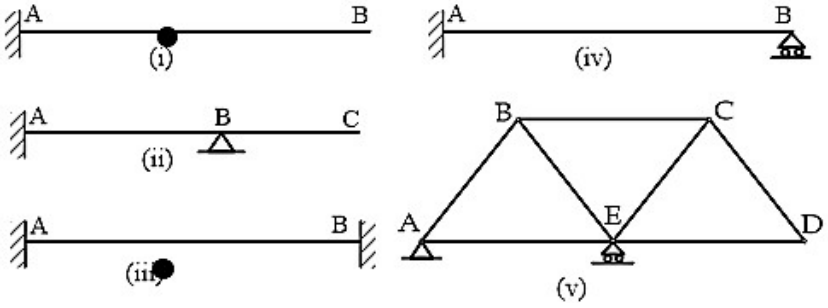
CLASS: BTECH **SEMESTER : III**
BRANCH: CEE **SESSION : MO/2025**

SUBJECT: CE24202 - STRUCTURAL ANALYSIS - I

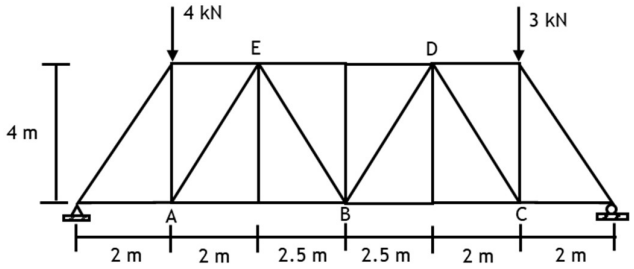
TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

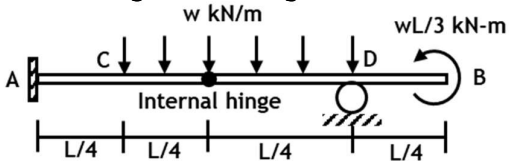
			CO	BL
Q.1(a)	Determine the degree of indeterminacy and comment on the stability of the structures.	[10]	1	K1 K2



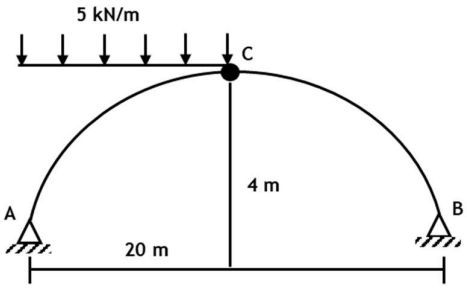
			CO	BL
Q.2(a)	What is the importance of zero force member in any truss. Analyze the truss and find out the member forces in AE, BE, BD, and CD.	[5]	2	K2 K3



			CO	BL
Q.2(b)	Draw the shear force and bending moment diagram of the beam shown below.	[5]	2	K2 K3



			CO	BL
Q.3(a)	Determine the SF and BM at a distance of 9 m from support A of the arch shown below.	**[5]**	**3**	**K2 K3**



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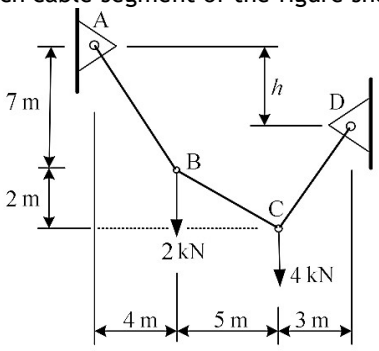
Q.3(b) Determine the tension in each cable segment of the figure shown below. [5]

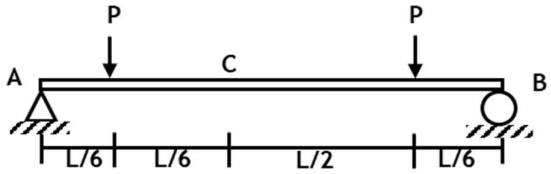


3 K2 K3

Q.4(a) Draw the influence line diagram in a simply supported beam for the following parameters. [5]

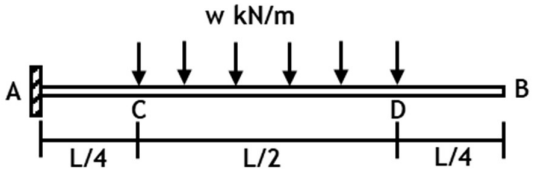
i. Reaction force at point A
ii. Shear force at point C (L/3 distance from support A)
iii. Bending moment at point C (2L/3 distance from the support A)

Find out the SF and bending moment at point C under the given load condition.



4 K2 K3

Q.4(b) Find out the vertical displacement at point C in the beam shown in the figure. Choose any method suitable for the problem. Consider EI to be constant throughout the length of the beam. [5]

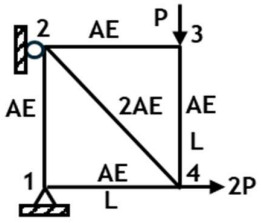


4 K2 K3

Q.5(a) Write down the Castigliano's theorems. [5]

5 K2 K3

Q.5(b) Determine the vertical displacement at node 4 of the truss shown in the figure. The cross-section area is A and modulus of elasticity E. [5]



5 K2 K3

:::::21/11/2025:::::E