Register Number:……..

KUMARAGURU
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B.E. DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

CIVIL ENGINEERING

U18CET5103 Structural Analysis

COURSE OUTCOMES

CO1: Calculate static and kinematic indeterminacy of structures.

CO2: Analyse beams and frames using moment distribution method.

CO3: Analyse beams and frames using matrix flexibility method.

CO4: Analyse beams and frames using matrix stiffness method.

CO5: Use the influence line diagram for analysis of determinate and indeterminate beams.

CO6: Analyse arches and suspension cables.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Differentiate determinate and indeterminate structures.	CO1	[K_2]
2.	Define kinematic indeterminacy.	CO1	[K_1]
3.	Define Carryover factor.	CO2	[K_1]
4.	Compare flexibility method and stiffness method.	CO3	[K_2]
5.	Write the element flexibility matrix for a truss member & for a beam element.	CO3	[K_2]
6.	List the reasons due to which sway may occur in portal frames.	CO4	[K_2]
7.	List the uses of Influence Lines.	CO5	[K_2]
8.	Draw the ILD for SF at 6m from the left support of a simply supported beam of span 26m.	CO5	[K_2]
9.	Calculate the degree of static indeterminacy for a three hinged parabolic arch.	CO6	[K_2]
10.	List the main functions of stiffening girders in suspension bridges?	CO6	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	Determine the static and kinematic indeterminacies for the structures shown in Fig.1.	16	CO1	[K_3]

12.		Using the moment distribution method, determine the end moments and the reactions at the supports of the beam shown in Fig.2. Draw the shearing force and the bending moment diagrams. EI = constant.	16	CO2	[K_4]
13.		Analyze the beam shown in Fig.3 using Matrix Flexibility method. Draw BMD.	16	CO3	[K_4]
14.		Analyze the beam shown in Fig.4 using Matrix stiffness method. Draw BMD and SFD.	16	CO4	[K_4]
15.		Draw Influence Line Diagram for shear force and bending moment at 3m from right support when 6m UDL of intensity 4kN/m crosses over 5m simply supported bridge from left to right. Calculate maximum negative, maximum positive shear force, maximum moment. Also, calculate absolute maximum positive, negative shear force and bending moment.	16	CO5	[K_3]
16.	a)	A parabolic arch with supports at the same level is subjected to the combined loading shown in Fig.5. Determine the support reactions and the normal thrust and radial shear at 150 kN concentrated load.	8	CO6	[K_3]
	b)	A cable subjected to a uniform load of 240 N/m is suspended between two supports at the same level 20 m apart, as shown in Fig.6. If the cable has central sag of 4 m, determine the horizontal reactions at the supports, the minimum and maximum tension in the cable, and the total length of the cable.	8	CO6	[K_3]

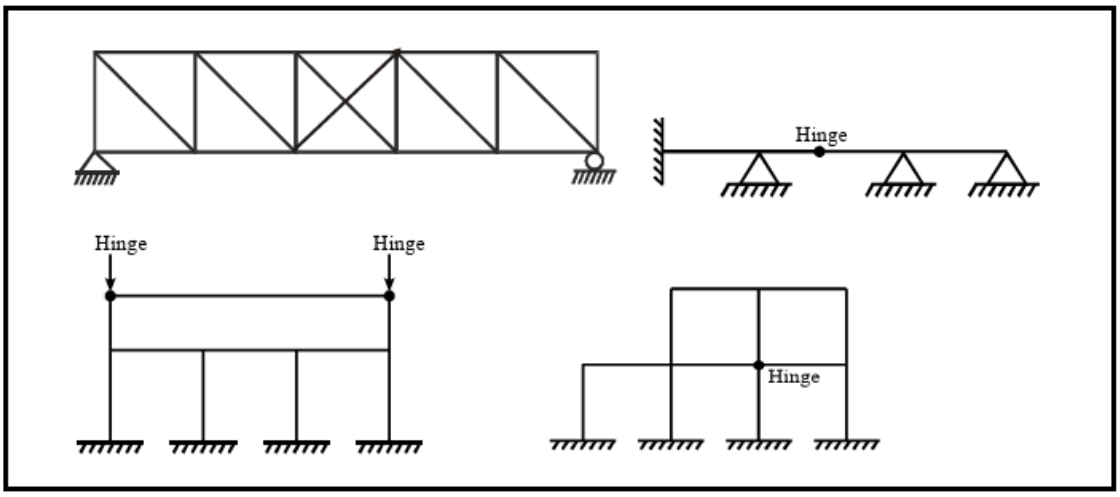

Fig.1

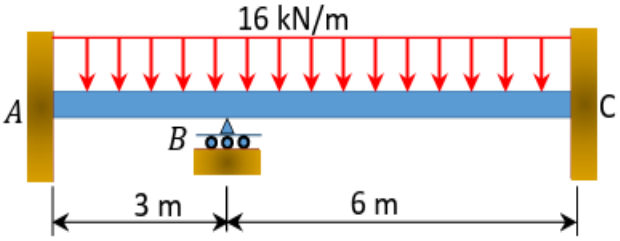

Fig.2

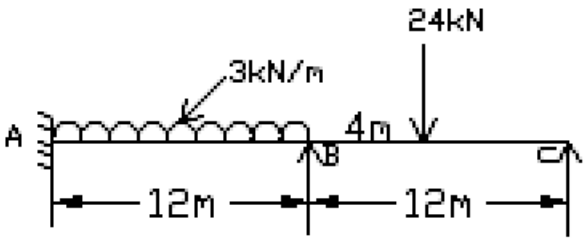

Fig.3

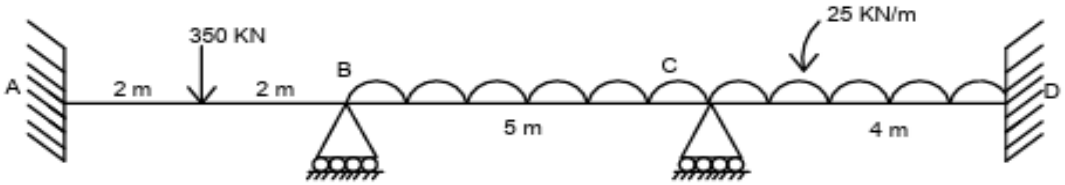

Fig.4

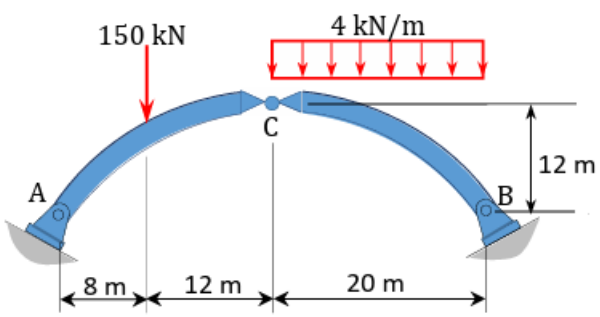

Fig.5

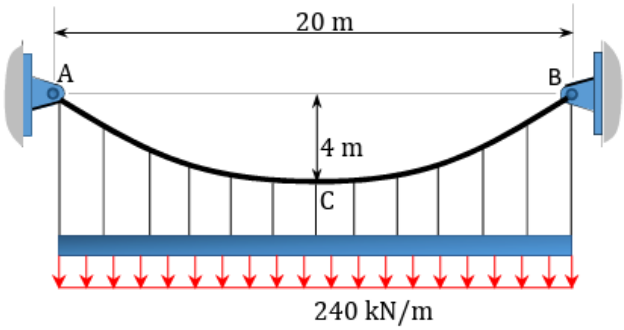

Fig.6

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