Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Seventh Semester - Regular) Examinations, November – 2024

21BCVPE47001 – STRUCTURAL ANALYSIS II

(Civil Engineering)

Time: 3 hrs Maximum: 70 Marks

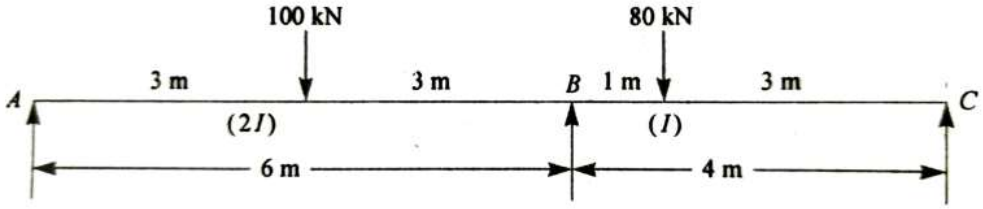
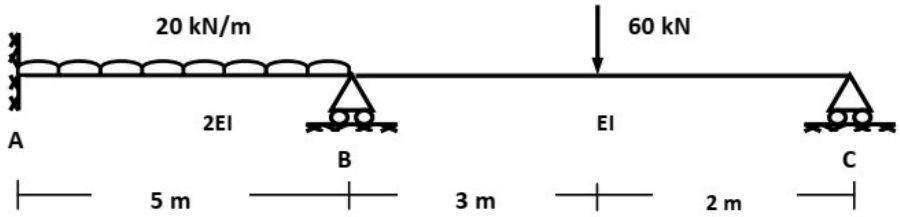
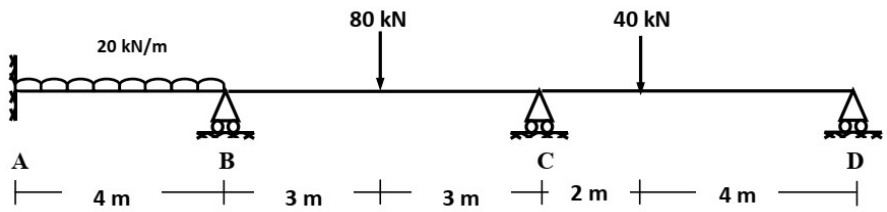
Answer ALL questions

(The figures in the right hand margin indicate marks)

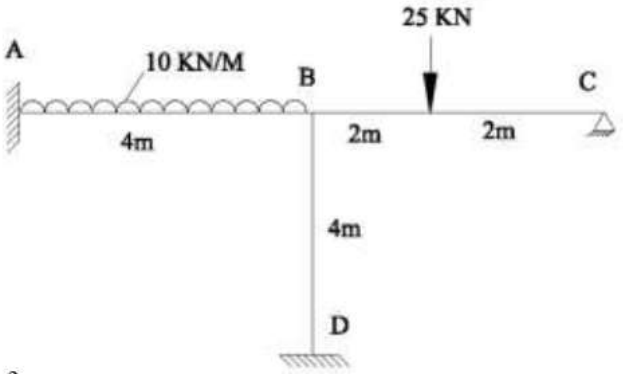
PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Bloom's Level
a. Write down the expression for the horizontal thrust of two hinged parabolic arch loaded with a point load at its crown.	CO2	K2
b. What is the shape factor of a circular section and a triangular section?	CO3	K2
c. Define determinate and indeterminate structure.	CO4	K2
d. Define Collapse load.	CO3	K2
e. What will be the carry-over moment and carry-over factor if the far end is fixed.	CO1	K2

PART – B **(15 x 4 = 60 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Bloom's Level
2. a. Analyze the structure using Moment distribution method. 	10	CO1	K4
b. Determine the fixed end moments and distribution factor of the structure. 	5	CO1	K3
(OR)			
c. Analyze the structure using Slope deflection method. 	10	CO1	K4

d. Determine the fixed end moments and distribution factor of the structure.



5 CO1 K3

3.a. A two-hinged parabolic arch of span 'l' and rise 'h' carries a concentrated load of 'w' at the crown. Determine the horizontal thrust at each support. Assume uniform flexural rigidity. 8 CO2 K3

b. A two-hinged semi-circular arch of radius 'R' carries a uniformly distributed load of 'w' per unit run over the whole span of length 'l'. Determine the horizontal thrust at each support. Assume uniform flexural rigidity. 7 CO2 K3

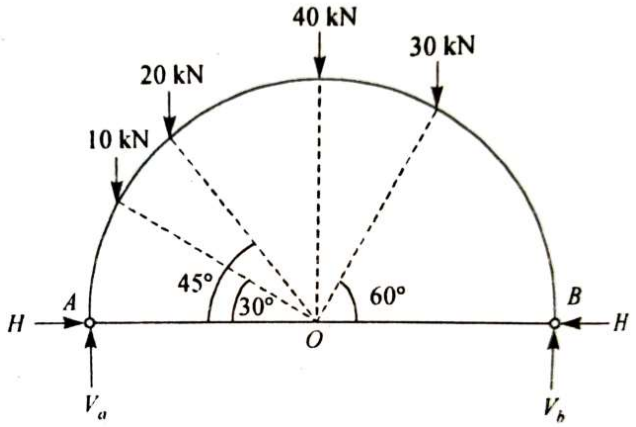
(OR)

c. A two-hinged parabolic arch of span 20 m and rise of 5 m carries a uniformly distributed load of 10 kN/m on the left half of the span. Determine

i. The horizontal thrust at each support.
ii. Position and magnitude of the maximum bending moment.
iii. Normal thrust and radial shear at the section of maximum B.M.

10 CO2 K4

d. Determine the horizontal thrust of the two-hinged semi-circular arch shown below:



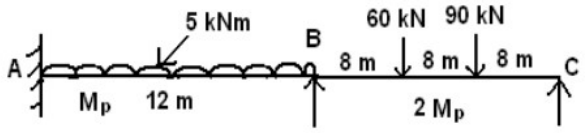
5 CO2 K3

4.a. Determine the shape factor of the I-section (Flange: $300\,mm \times 20\,mm$ and Web: $250\,mm \times 10\,mm$). If the yield stress is 240 MPa, find the plastic moment of the section. 10 CO3 K3

b. Determine the collapse load in the simply supported beam subjected to a point load in the centre using Kinematic method. 5 CO3 K3

(OR)

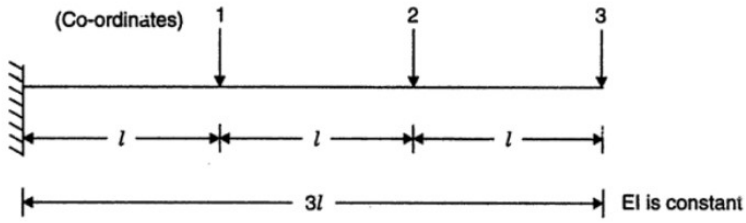
c. A continuous beam ABC is loaded as shown in figure. Determine the required M_P.



10 CO3 K3

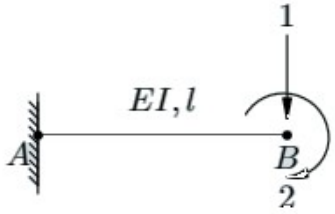
d. Determine the shape factor of a rectangular section. 5 CO3 K3

5.a. Find the flexibility matrix.



8 CO4 K3

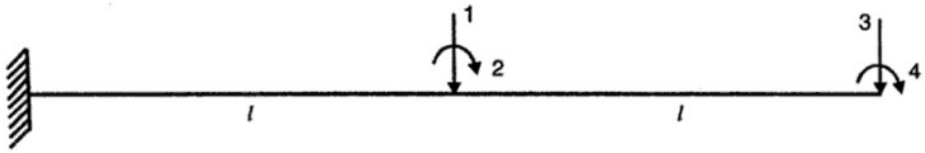
b. Find the flexibility matrix.



7 CO4 K3

(OR)

c. Find the flexibility matrix.



10 CO4 K3

d. Define Stiffness and flexibility matrix. 5 CO4 K2

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