Total No. of Questions: 6   *Total No. of Printed Pages:4*

Enrollment No...................................

Faculty of Engineering
End Sem Examination Dec 2024
CE3CO25 Structural Analysis -II

Programme: B.Tech.   Branch/Specialisation: CE

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	In Kani's Method, what type of structures is it primarily used for?	1	1	1	1,3 12	1,2 3
		(a) Simply supported beams					
		(b) Statically determinate structures					
		(c) Statically indeterminate structures					
		(d) Trusses and frames					
	ii.	Carryover Moment is defined as _____.	1	2	1	1,3 12	1,2 3
		(a) The moment applied at one end to cause unit slope at the support					
		(b) The additional moment applied at one end to completely resist the rotation caused due to external loading					
		(c) The moment developed or induced at one end due to a moment at another end					
		(d) The moment applied at one end to cause unit slope at another end					
	iii.	In stiffness matrix method of structure analysis, the quantity taken as redundant is:	1	1	2	1,3, 4,5, 6,12	1,2 3
		(a) Deflection (b) Rotation					
		(c) Both (a) and (b) (d) None of these					
	iv.	Stiffness matrix represents a system of _____.	1	1	2	1,3, 4,5, 6,12	1,2 3
		(a) Programming equations					
		(b) Iterative equations					
		(c) Linear equations					
		(d) Program CG SOLVING equations					

P.T.O.

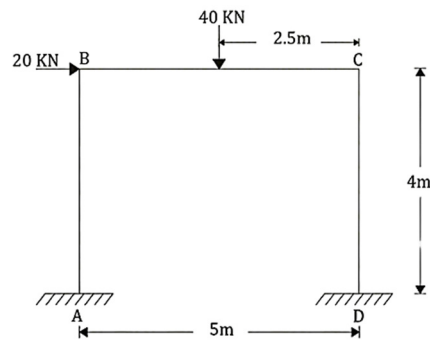|							
Q.5	i.	Draw the ILD for horizontal thrust and bending moment for three hinge parabolic arch.	3	2	4	1,3,4	1,2 3
	ii.	Draw the ILD for shear force at a section which is at a distance of 3 m from right support in a following continuous beam and calculate ordinates at 1 m interval.	7	5	4	1,3,4	1,2 3

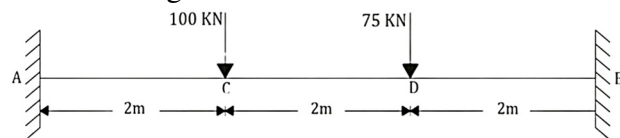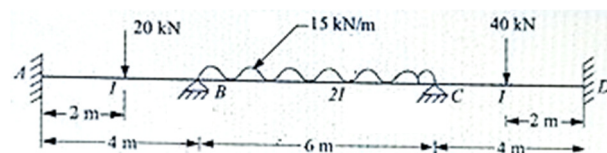|							
OR	iii.	A two hinged parabolic arch of span 24m carrying a point load of 10kN at the centre. Calculate the horizontal thrust, bending moment, normal thrust and radial shear at 6m from left support. Also draw bending moment diagram.	7	3	4	1,3,4	1,2 3

Q.6		Attempt any two:					
	i.	Calculate the plastic moment carrying capacity of the frame with working loads as shown in the figure. Take load factor 1.5.	5				1,2

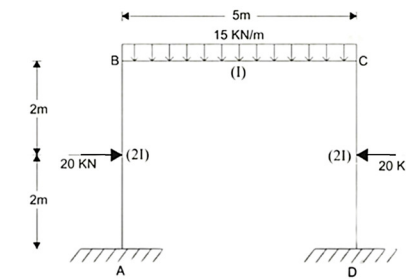|							
	ii.	Write short note on	5				1,2
		(a) Plastic moment and plastic hinge					
		(b) Stress-strain curve of steel					
	iii.	Determine the plastic moment capacity of the fixed beam as shown in figure. Assume uniform section throughout.	5				1,2

v. What is the primary purpose of the portal frame method in structural analysis?
(a) To calculate support reactions
(b) To analyze portal frames
(c) To design truss structures
(d) To calculate beam deflections

1   2   3   1,3   1,2
                              4,12   3

vi. How many assumptions are made in portal method for analyzing fixed-supported building?
(a) 1   (b) 3   (c) 2   (d) 4

1   1   3   1,3   1,2
                              4,12   3

vii. What role do the hinges in a two-hinge arch plays in its stability and flexibility?
(a) They provide rigid support
(b) they allow rotation and flexibility
(c) They carry the entire load
(d) They act as decorative element

1   2   4   1,3   1,2
                              4

viii. An arch is a beam except for _____.
(a) It does not resist inclined load
(b) It does not allow rotation at any point
(c) It does not resist transverse forces
(d) It does not allow horizontal movement

1   1   4   1,3   1,2
                              4

ix. The shape factor of diamond section is-
(a) 1   (b) 1.5
(c) 2   (d) 2.34

1   1   5   1,3   1,2
                              4,5
                              6,7
                              9,12

x. Which load is obtained when equilibrium and mechanism conditions of plastic analysis are satisfied?
(a) Plastic limit load
(b) Upper bound solution of true ultimate load
(c) Lower bound solution of true ultimate load
(d) No solution

1   2   5   1,3   1,2
                              4,5
                              6,7
                              9,12

Q.2 i. State the advantages of Kani's Method over moment distribution method.

2   2   1   1,3   1,2
                              12   3

ii. Analyze the continuous beam as shown by Kani's method-
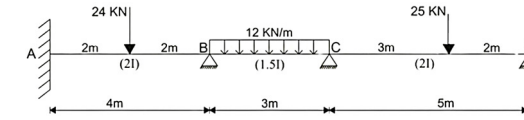
8   3   1   1,3   1,2
                              12   3
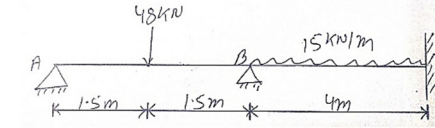

OR iii. Determine the moments of the members of the given frame by using Kani's Method.

8   3   1   1,3   1,2
                              12   3

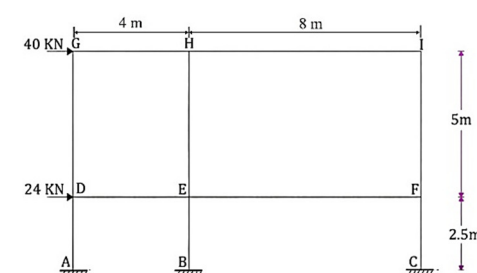Q.3 i. Compare flexibility method and stiffness method.

4   2   2   1,3,4   1,2
                              5,6   3
                              12

ii. Determine the reaction and moment at supports by stiffness matrix method.

6   3   2   1,3,4   1,2
                              5,6   3
                              12

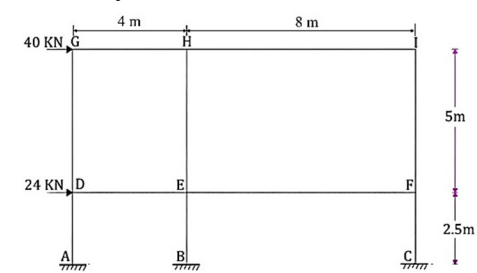OR iii. Analyze the beam by flexibility matrix method.

6   4   2   1,3,4   1,2
                              5,6   3
                              12

Q.4 i. Explain the assumption used in portal method?

3   2   3   1,3,4   1,2,3
                              12

ii. Analyze the following frame using portal method-

7   4   3   1,3,4   1,2
                              12   3

OR iii. Determine the beam and column moment of the given frame by cantilever method.

7   3   3   1,3,4   1,2
                              12   3

Q.1   i)   C   1
    ii)   C   1
    iii)   C   1
    iv)   C   1
    v)   B   1
    vi)   B   1
    vii)   B   1
    viii)   D   1
    ix)   C   1
    x)   B   1

Q.2   i.   Advantages of Kani's Method over Moment Distribution method.   **2**
    1 mark for each advantages (1 mark * 2)
    ii.   Determination of Fixed End Moment 1 mark   **8**
    Moment distribution cycle 3 marks
    Shear equation 2 marks
    Final end Moment 1 mark
    BMD 1 mark

OR   iii.   Determination of Fixed End Moment 2 marks   **8**
    Kani's cycle 3 marks
    Final end Moment 1 mark
    BMD 2 marks

Q.3   i.   0.5 mark for each comparison (1 mark * 4)   **4**
    ii.   Determination of Fixed End Moment 2 marks   **6**
    Stiffness Matrix 2 marks
    Final end Moment 1 mark
    BMD 1 marks

OR   iii.   Determination of Fixed End Moment 2 marks   **6**
    Flexibility Matrix 2 marks
    Final end Moment 1 mark
    BMD 1 marks

Q.4   i.   Each Assumption 1 mark   **3**
    ii.   Shear in column 1 mark   **7**

Moments in column 2 marks
Moments in beams 2 marks
Shear in beams 1 mark
Axial force in column 1 mark

OR   iii.   Shear in column 1 mark   **7**
Moments in column 2 marks
Moments in beams 2 marks
Shear in beams 1 mark
Axial force in column 1 mark

Q.5   i.   ILD for horizontal thrust 1.5 Marks   **3**
    ILD for bending moment 1.5 marks
    ii.   Shape of ILD 2 marks   **7**
    Determination of ordinate at 1 m interval 5 mark

OR   iii.   Calculate the horizontal thrust 1 marks   **7**
    bending moment 2 marks
    normal thrust 2 marks
    radial shear 2 marks

Q.6   Attempt any two
    i.   Plastic moment 2.5 marks   **5**
    Collapse load 2.5 marks
    ii.   A) Plastic Moment and Plastic Hinge   2.5 marks   **5**
      B) Stress-Strain Curve of steel 2.5 marks

    iii.   Plastic moments 5 marks   **5**

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