Reg No.:_____ Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Supplementary Examination August 2024

Course Code: CE403
Course Name: STRUCTURL ANALYSIS - III

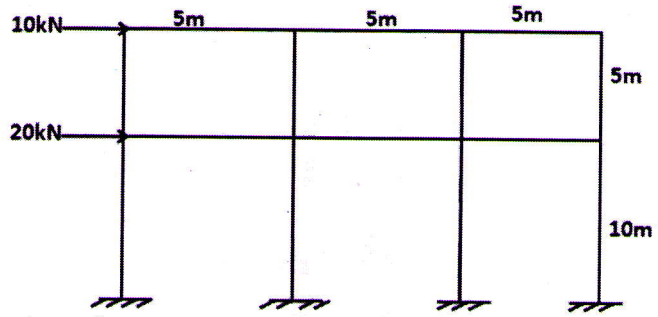
Max. Marks: 100 Duration: 3 Hours

PART A

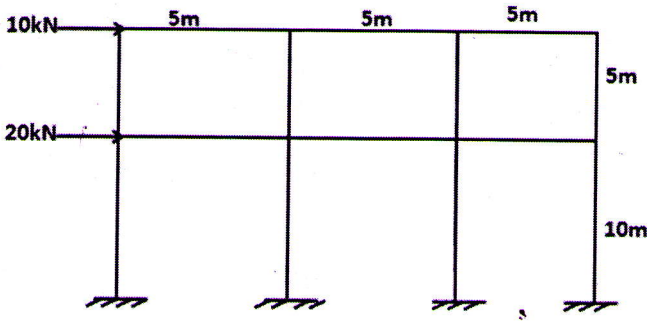
Answer any two full questions, each carries 15 marks. Marks

1 a) What are the assumptions involved in Portal method? (2)

b) Analyse the rigid frame shown using Portal method. Beams and columns have same size. (13)



2 a) Analyse the rigid frame shown using Cantilever method. Area of cross section of all columns is same. (13)



b) Define Flexibility influence coefficients. (2)

3 a) Define stiffness influence coefficients. Illustrate with suitable examples (5)

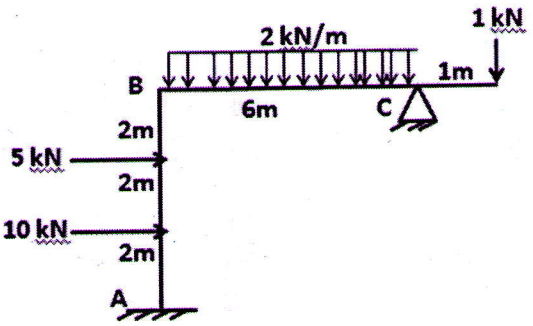
b) Differentiate between force method and displacement method of analysis. (5)

c) What is the relationship between stiffness and flexibility matrix? (5)

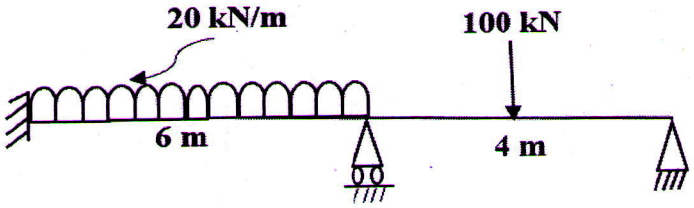
PART B

Answer any two full questions, each carries 15 marks.

4 a) Determine the equivalent joint loads on the Frame shown in figure. (5)

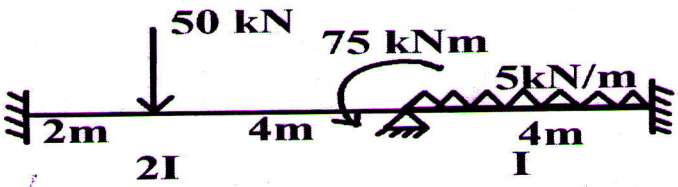


b) Analyse the continuous beam shown in Figure using flexibility matrix method. (10)
Draw BMD.

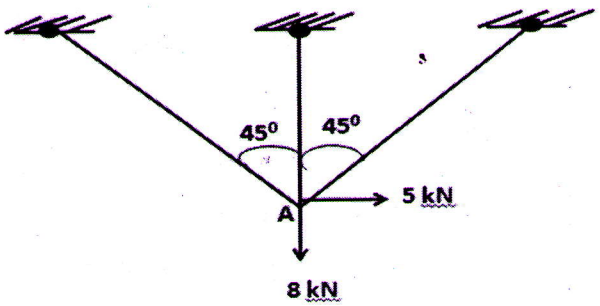


5 a) Discuss the procedure of Direct Stiffness Method in the matrix analysis (5)

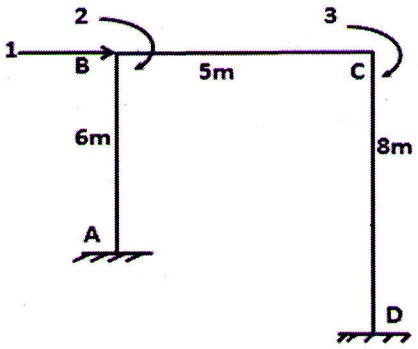
b) Analyse the continuous beam shown in Figure using direct stiffness method. (10)
Draw BMD.



6 a) Analyse the Plane Truss given by stiffness method. Assume EA/L=1 for all the members. (10)



b) Form the displacement transformation matrix with reference to the given coordinatesfor the structure shown. (5)



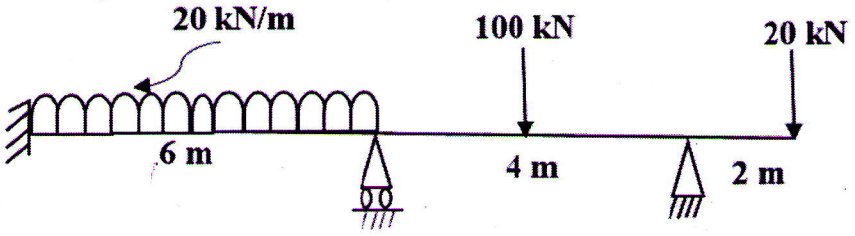
PART C

Answer any two full questions, each carries 20 marks.

7 a) Derive the element stiffness matrix for a beam element with 2DoF at each node (5)

b) A single storey building idealized as a rigid girder supported by weightless columns. It was found that a lateral force of 100 kN required to produce a lateral displacement of 6 mm. The displacement in the return swing was 4mm and the period of displacement cycle was 2s. From the data determine the damped and undamped natural frequencies, effective weight of girder, coefficient of viscous damping and displacement after 6 cycles. (15)

8 a) Analyse the structure shown by direct stiffness method. Assume constant EI for all the members. (15)



b) Explain D'Alembert's Principle. (5)

9 a) Derive the equation of motion of a SDOF system subjected to un-damped free vibration and subsequently the displacement (motion) form. (10)

b) Explain the following: i) Logarithmic decrement ii) Dynamic magnification factor iii) Critical Damping iv) Vibration isolation (10)

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