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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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 in cantilever method of analysis? (2)

b) Analyse the frame shown in figure 1 using cantilever method. Cross-sectional area of members are shown in figure. (13)

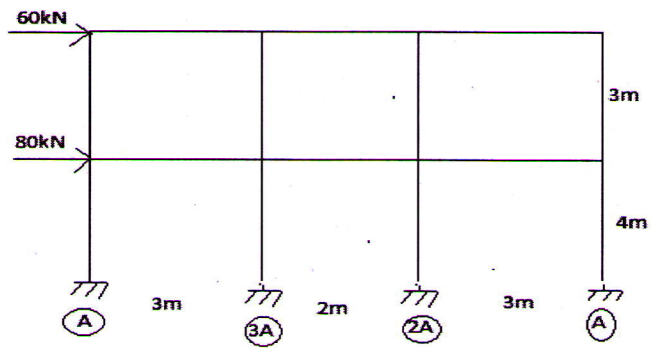

Fig 1

2 a) Explain the formulae to find out the kinematic indeterminacy of pin-jointed and rigid-jointed frames. (5)

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

c) Compare nodal degrees of freedom and joint degrees of freedom. (5)

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

b) Explain the general procedure followed in displacement method of analysis (7)

c) Define equilibrium and compatibility. (3)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Discuss the formation of flexibility matrix for frame element (10)

b) Discuss basic concepts of flexibility method (5)

5 a) Derive the stiffness matrix for the structure with coordinates as shown in Fig.2. (5)

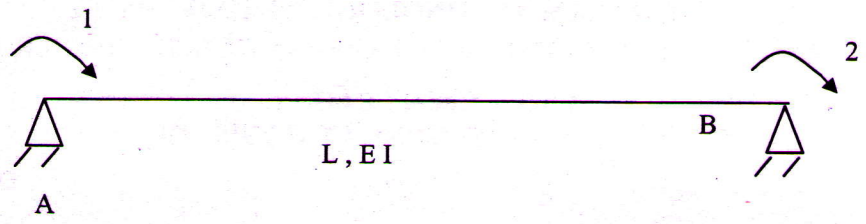

Fig. 2

b Analyse the rigid frame loaded as shown in Fig.3. using stiffness method (10)

$E = 200 \times 10^6$ kN / m^2; $I = 500 \times 10^{-6}$ m^4

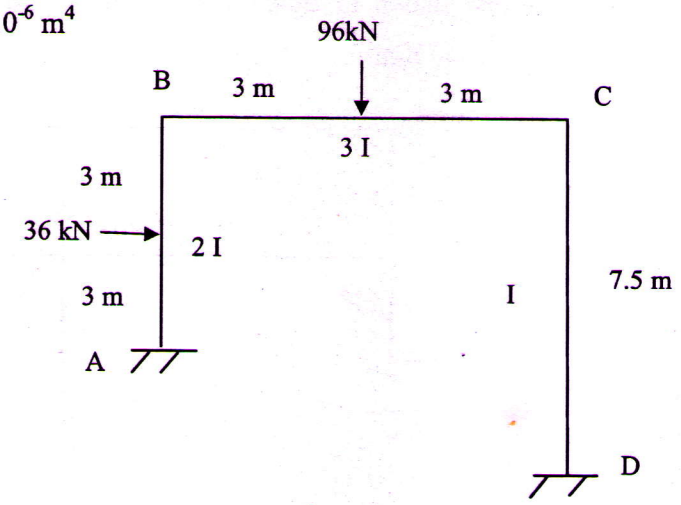

Fig.3

6 a) Explain how the effect of calibration error or temperature changes is considered in the analysis of trusses by matrix displacement method (5)

b) Find the forces in the members of the truss loaded as shown in Fig.4. using stiffness method. Take axial rigidity AE = unity for all members. (10)

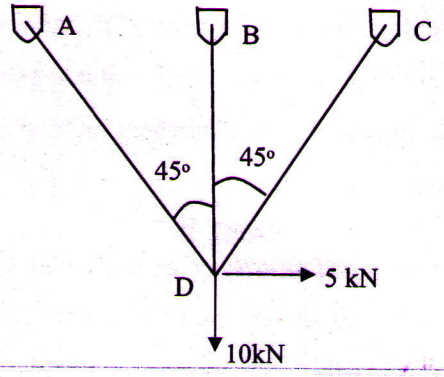

Fig. 4.

PART C

Answer any two full questions, each carries 20 marks.

7 a) Describe the stiffness matrix of elements in global coordinates from element coordinates (5)

b) Analyse the beam shown in figure 5 using direct stiffness method and draw the BMD (15)

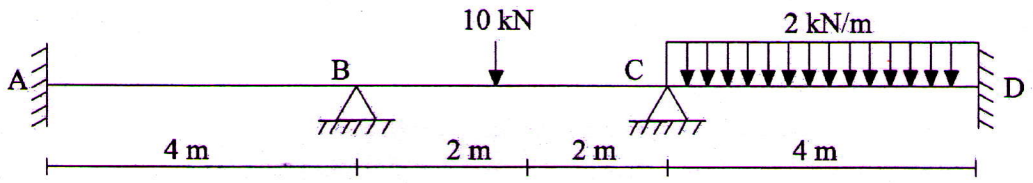

Fig 5

8 a) Explain the rotation of axes in 2 Dimensions (5)

b) An overhanging beam is shown in figure 6. Analyse the structure using Direct Stiffness Method and draw BMD (15)

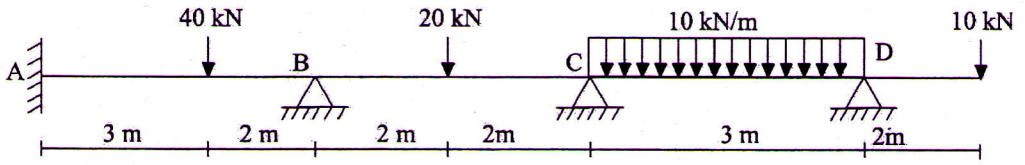

Fig 6

9 a) Explain logarithmic decrement.Derive the equation for logarithmic decrement. (5)

b) Derive the response of the free vibration system with damped case and calculate the free vibration response of a SDOF system at time t=0.20 sec. for the following data (15)

Natural frequency ω= 12 rad/sec

Damping coefficient ξ =0.15

Initial velocity=10 cm/sec

Initial displacement=5 cm

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