Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

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 portal method of analysis? (2)

b) Analyse the frame shown in figure 1 using portal method (13)

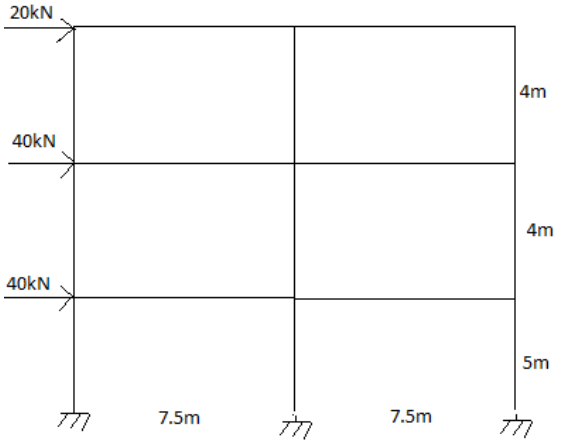

Fig 1

2 a) Explain static, external and internal indeterminacy with examples. (5)

b) Explain the concept of physical approach (5)

c) Define kinematic indeterminacy. Compute the kinematic indeterminacy of a rigid jointed frame of column height ‘h’ and beam span ‘l’ with one end fixed and other end hinged, if only the beam axial deformations are neglected. (5)

3 a) Compare the analysis by flexibility and stiffness matrix (10)

b) Explain the formulae to find out the static indeterminacy of pin-jointed and rigid-jointed frames (5)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Explain the load transformation matrix approach in flexibility method (8)

b) Explain analysis of plane trusses by flexibility method (7)

5 a) Analyse the plane frame shown in figure 2 by flexibility matrix method and draw (15)

the SFD and BMD. The bottom support is fixed and top support is roller.

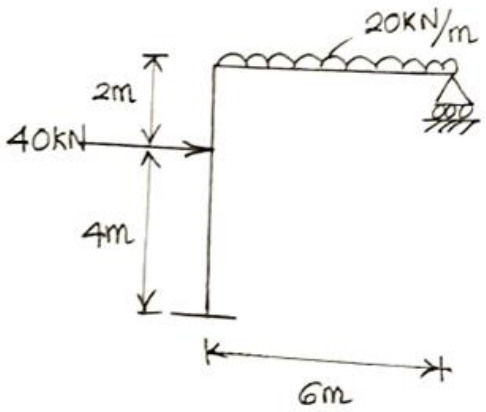

Fig 2

6 a) Define kinematic indeterminacy. Determine the kinematic indeterminacy of the following structures in Fig 3. (5)

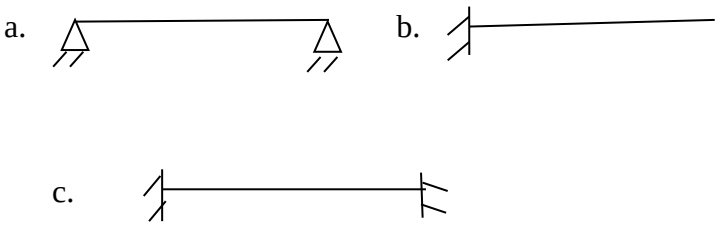

Fig.3

b) Analyse the truss shown in Fig. 4 (with active global coordinates, as shown) and find the joint displacements, support reactions and bar forces. The truss is subjected to direct loads F1 = 50 kN; F2 = 30 kN, and a lack of fit due to bar AC being too long by 5 mm. Assume all bars to have same axial rigidity AE = 6000 kN. Use stiffness matrix method. (10)

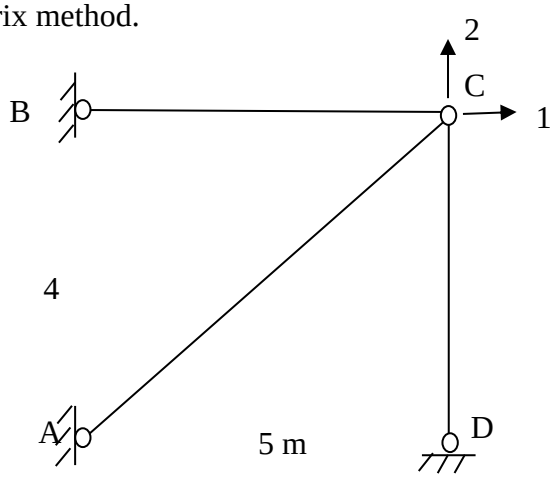

Fig 4

PART C

Answer any two full questions, each carries 20 marks.

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

b) Analyse the continuous beam shown in figure 5 using Direct Stiffness Method shown in figure and develop the BMD (15)

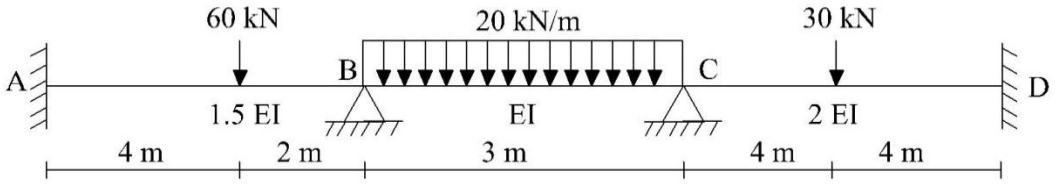

Fig 5

8 a) Explain Direct Stiffness Method in the matrix analysis (5)

b) Analyse the beam shown in figure 6 using Direct Stiffness Method shown in figure and determine the member forces and moments. (15)

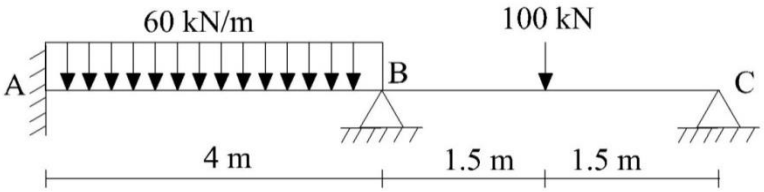

Fig 6

9 a) Write the equation of motions corresponding to the damped and undamped free and forced vibration. (5)

b) Derive the equations for response of SDOF system subjected to damped free vibration in ‘x’ direction with inertia constant m, spring constant k and damping constant c. Draw the response diagram also. (15)