Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CE403
Course Name: STRUCTURL ANALYSIS - III

Max. Marks: 100   Duration: 3 Hours

Assume missing data if any and state it
PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) What are the assumptions involved in cantilever method?   3

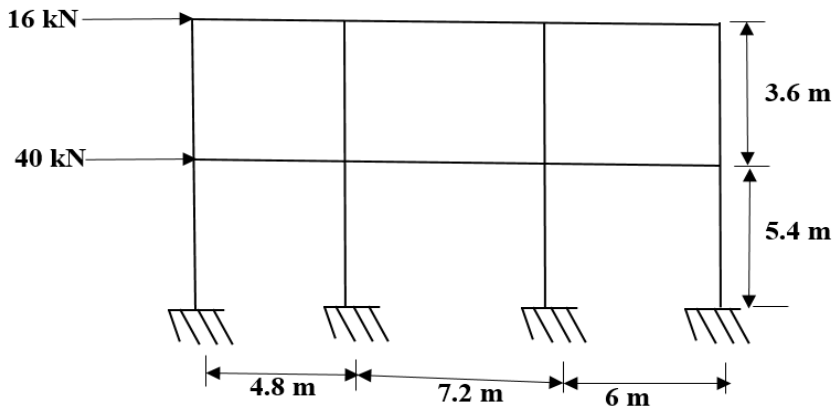   b) Analyse the frame in Figure.1 using portal method. Beams and columns have same size.

Figure. 1

12

2 a) Find the maximum hogging moment and shear force at the support due to gravity loading in the frame shown in Figure.2. Frames are spaced at 3.0 m c/c. Dead load = 3 kN/m^2, Live load = 2 kN/m^2, Weight of beam = 2 kN/m and storey height = 3 m.
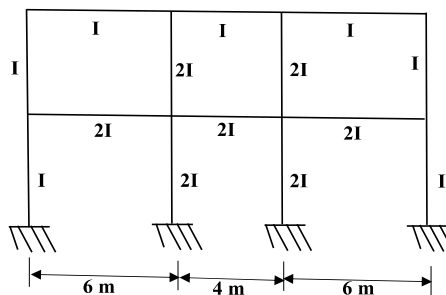

Figure. 2

10

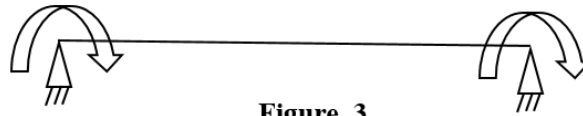b) Derive Flexibility matrix for the following beam element in Figure.3.

5

Figure. 3

3 a) Find the Kinematic indeterminacy and Static indeterminacy of the continuous beam (Figure.4) , pin jointed frame (Figure.5) and rigid frame (Figure.6)
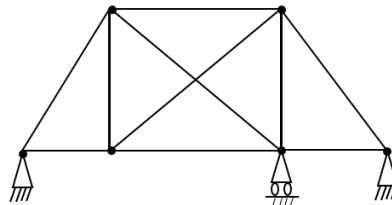

Figure. 4- Discard axial forces

9

Figure. 5

Figure. 6
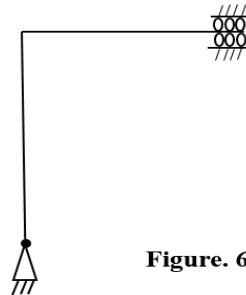
b) Derive Flexibility matrix for the truss element.   3

c) Define flexibility coefficient and stiffness coefficient.   3

PART B

Answer any two full questions, each carries 15 marks.

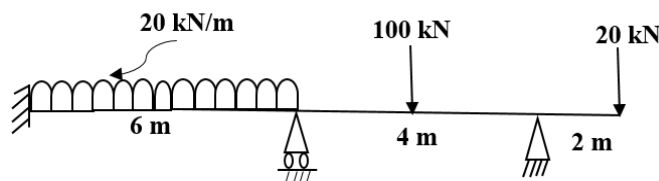4 a) Analyse the continuous beam shown in Figure.7, using flexibility matrix method and find the bending moments.

15

Figure. 7

5 a) Establish the relationship between flexibility matrix and stiffness matrix.   4

    b) What is displacement transformation matrix?   5

    c) What is lack of fit? Explain one method to estimate the member forces due to lack of fit using either flexibility or stiffness methods.   6

6 a) Find the member forces in the truss shown in Figure.8 using stiffness method.   15
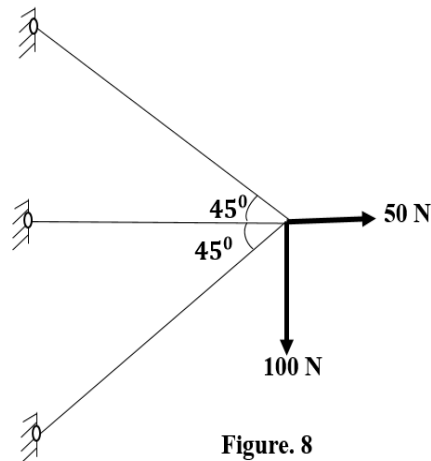
Figure. 8

PART C

Answer any two full questions, each carries 20 marks.

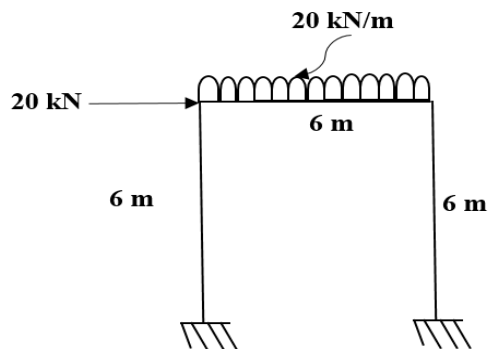7 a) Analyse and draw bending moment diagram for the frame shown in Figure.9 using direct stiffness method.

Figure. 9

                                                                       17

    b) What is direct stiffness method?   3

8 a) Differentiate between local coordinates and global coordinates.   4

    b) How global stiffness matrix can be derived from the element stiffness matrix?   6

    c) Describe Vibration Isolation? What are the different types of vibration isolation?   10

9 a) What is critical damping?   3

    b) What is magnification factor?   3

c) A person standing on a spring produces a deflection of 1.0 mm to the spring. Find the natural frequency and Time period.   4

d) A vibrating system consists of mass of 10 kg, spring of stiffness 240 N/m and a damper with a damper coefficient of 10 N-s/m. Determine

    i) Damping factor

    ii) Natural frequency of damped vibration   10

    iii) Logarithmic decrement

    iv) Ratio of successive amplitudes

    v) Number of cycles after which initial amplitude reduced to 25%

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