Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) (FT/WP) Examinations April 2026 (2019 Scheme)

Course Code: CET302

Course Name: STRUCTURAL ANALYSIS-II

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1	Write short note on the approximate method of analysis of multi storeyed building for vertical load.	(3)
2	Define plastic hinge.and collapse load	(3)
3	What are the assumptions made in cantilever method of analysis ?	(3)
4	What are the assumptions made in Portal frame method of analysis ?	(3)
5	Write down the properties of stiffness matrix.	(3)
6	Differentiate between force method and displacement method of analysis	(3)
7	What are the advantages of direct stiffness matrix method of analysis over stiffness matrix method of analysis?	(3)
8	Differentiate between local coordinates and global coordinates	(3)
9	State and explain D'Alembert's principle.	(3)
10	Differentiate between damped and undamped vibration.	(3)

PART B

Answer onefull question from each module, each carries 14 marks.

Module I

11 a) In a multi-storeyed building, the frame shown in Fig.1 is spaced at 4m intervals. Dead load from the slab is 3kN/m^{2}and the live load is 4kN/m^2. Analyse the beam BC for maximum mid span bending moment by substitute frame method. Self-weight of the beams may be ignored. EI is constant throughout. (14)

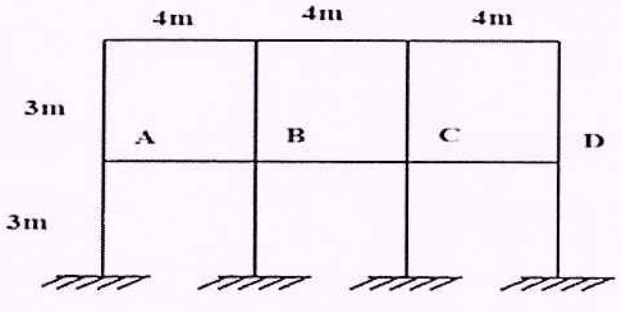

Fig.1

OR

12 a) Derive the shape factor for rectangular section and circular section. (14)

Module II

13 a) Analyse the frame shown in Fig.2 for lateral loads using portal method (14)

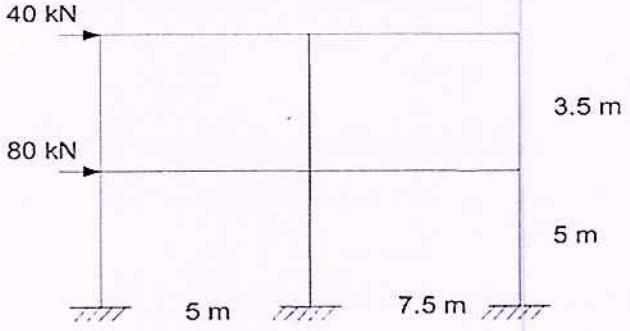

Fig.2

OR

14 a) Analyse the beam in figure 3 by Flexibility method and draw the bending moment diagram. EI is constant. (14)

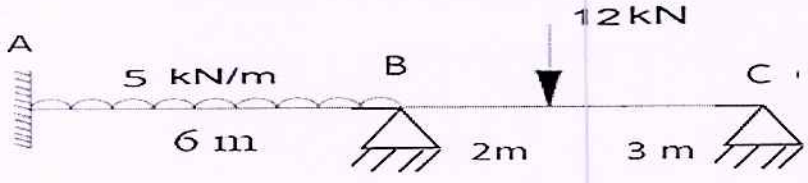

Fig.3

Module III

15 a) Find the forces in the members of the truss loaded as shown in figure 4 using stiffness method. Assume axial rigidity same for all members. (14)

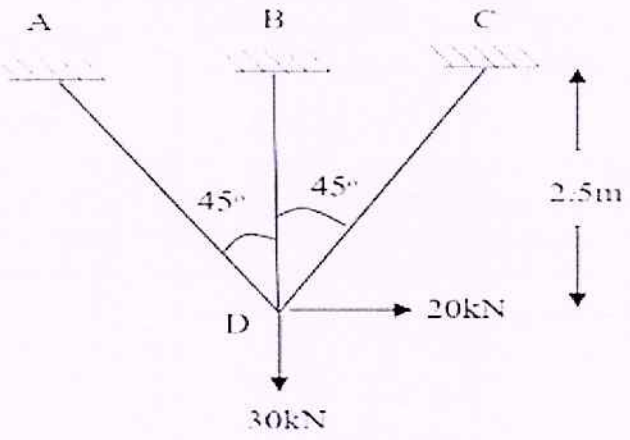

Fig.4

OR

16 a) Analyze the portal frame given in Figure 5 by stiffness matrix method. Take EI constant. (14)

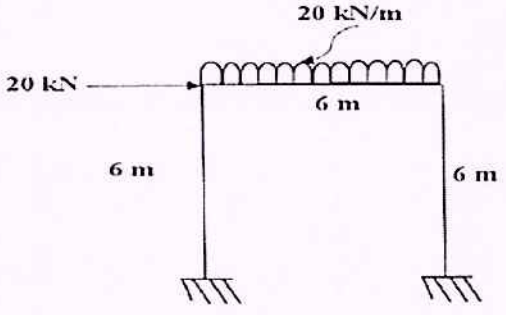

Fig.5

Module IV

17 a) Analyse the beam shown in figure 6 using direct stiffness method and draw the BMD (14)

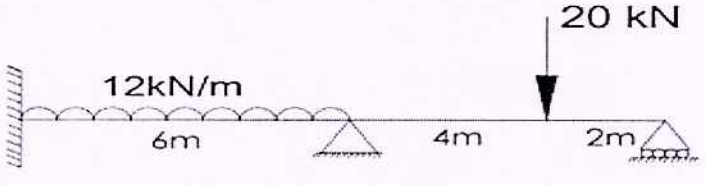

Fig.6

OR

18 a) Discuss the procedure of Direct Stiffness Method in the matrix analysis. (8)

b) Obtain the rotation transformation matrix of a truss element (6)

Module V

19 a) 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. (14)

OR

20 a) A vibrating system consists of a mass 5kg and a spring of stiffness k = 120 N/m is viscously damped with damping coefficient 5NS/m. Determine a) damping ratio b) the natural frequency of damped vibration c) logarithmic decrement d) ratio of two successive amplitudes e) no of cycles after which the amplitude reduces to 25%. (14)

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