Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) (FT/WP/S4 PT) Examination December 2025 (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 Derive an expression for the shape factor of a rectangular cross section. (3)

2 Differentiate between elastic and plastic analysis of structures. (3)

3 What is the relationship between stiffness and flexibility matrix (3)

4 What are the assumptions made in the portal method of analysis for horizontal loads? (3)

5 Write down the properties of stiffness matrix. (3)

6 List the main steps involved in the stiffness method of structural analysis. (3)

7 Differentiate between local coordinates and global coordinates (3)

8 What are the advantages of direct stiffness matrix method of analysis over stiffness matrix method of analysis? (3)

9 Explain the components of the basic dynamic system. (3)

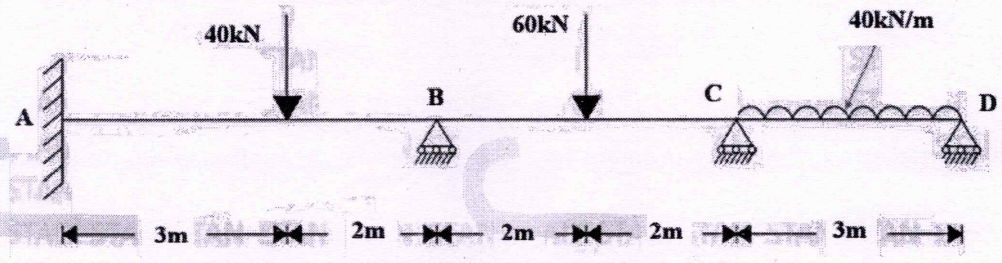
10 State and explain D'Alembert's principle. (3)

PART B

Answer one full question from each module, each carries 14 marks.

Module I

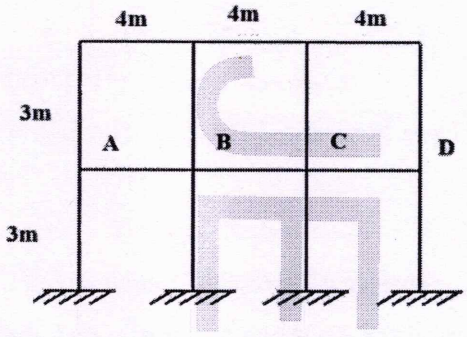
11 a) Determine the plastic moment carrying capacity Mp for the continuous beam shown in figure below. Assume uniform section throughout. (14)



OR

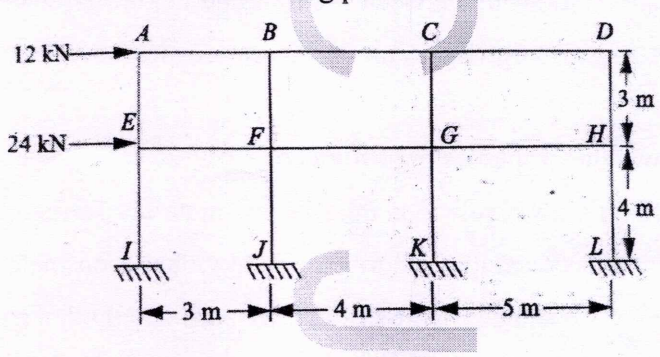
12 a) In a multi-storeyed building, the frame shown is spaced at 4m intervals. Dead load from the slab is 3kN/m^2 and the live load is 4kN/m^2. Analyse the beam BC for (14)

maximum mid span bending moment by substitute frame method. Self-weight of the beams may be ignored. EI is constant throughout.



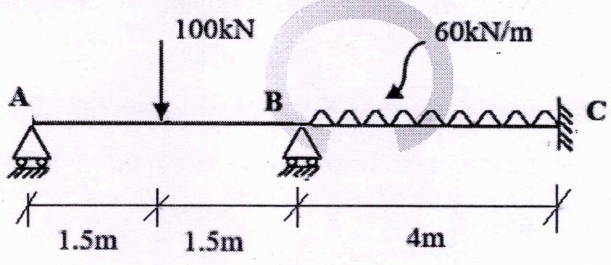
Module II

13 a) Analyse the frame for lateral loads using portal method. (14)



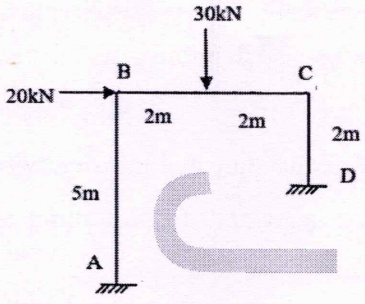
OR

14 a) Analyse the continuous beam shown in figure below by flexibility method and draw the BMD. (14)



Module III

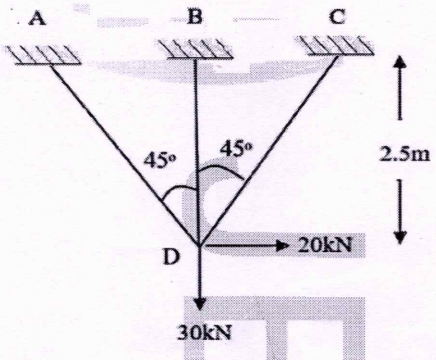
15 a) Determine the end moments for the frame shown in figure below by stiffness method. (14)



OR

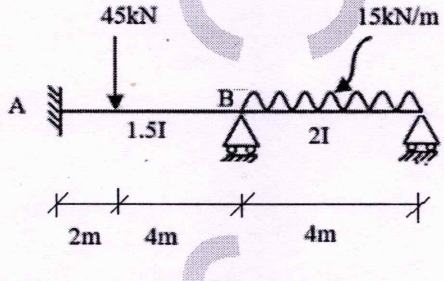
16 a) Derive the stiffness matrix of a pin jointed two-dimensional frame element, inclined at Θ to x axis. (8)

b) Find the stiffness matrix for the truss shown in figure. Area of cross section $=1000mm^2$ and modulus of elasticity $=200kN/mm^2$ (6)



Module IV

17 a) Analyse the continuous beam shown in figure by direct stiffness method and draw the Bending moment diagram. (14)



OR

18 a) Discuss the procedure of Direct Stiffness Method in the matrix analysis. (6)

b) Derive the local stiffness matrix for a two-nodded beam element. having four degrees of freedom $v_1,\theta_1,v_2,\theta_2$. (8)

Module V

19 a) Derive the equations for response of SDOF system subjected to damped free (14)

vibration in 'x' direction with inertia constant m, spring constant k and damping constant c. Draw the response diagram also.

OR

20 a) Differentiate between steady state and transient vibration (6)

b) Explain (i) logarithmic decrement (ii) Damping ratio and (iii) Critical damping (iv) magnification factor (8)

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