Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Examination June 2022 (2019 Scheme)

Course Code: CET302

Course Name: STRUCTURAL ANALYSIS-II

Max. Marks: 100 Duration: 3 Hours

PART A

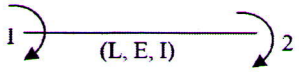
Answer all questions, each carries 3 marks. Marks

1. a) Define shape factor. Obtain the shape factor for solid circular section of diameter D. (3)

   b) Mention the advantages and disadvantages of approximate method of analysis. (3)

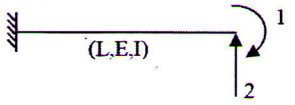
   c) What are the assumptions made in the portal method of analysis for horizontal loads? (3)

   d) Derive flexibility matrix for the co-ordinates for the beam element shown below. (3)



   e) Compare force method and displacement method of analysis. (3)

   f) Derive the stiffness matrix for the co-ordinates shown in figure below. (3)



   g) What are the steps involved in direct stiffness method of analysis. (3)

   h) Differentiate between local coordinates and global coordinates. (3)

   i) Compare transient and steady state response of a SDOF system subjected to harmonic load. (3)

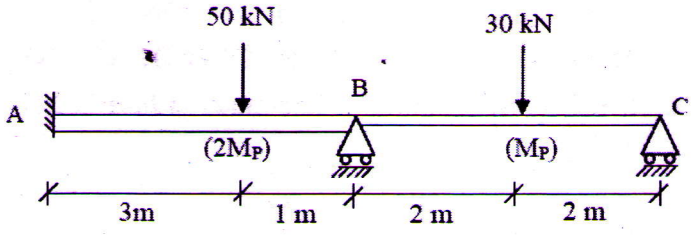
   j) Define the following terms: (i) free and forced vibration (ii) damped and undamped vibration. (3)

PART B

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

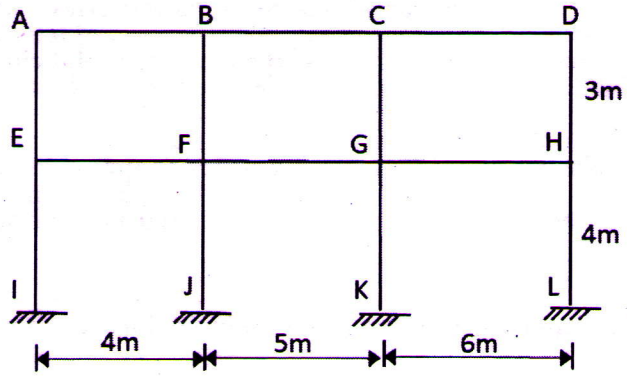
Module I

2. Determine the plastic moment carrying capacity M_p for the continuous beam shown in figure below. Take load factor = 1.5 (14)



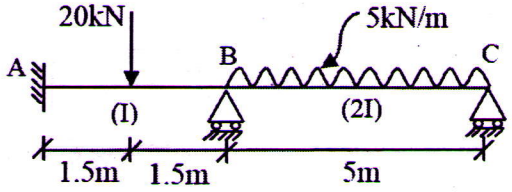
OR

3. Analyse the frame shown below for midspan positive moment on span FG, using Substitute frame method. Total dead load is 15kN/m and total live load is 30kN/m. Flexural rigidity EI is same for all members. (14)



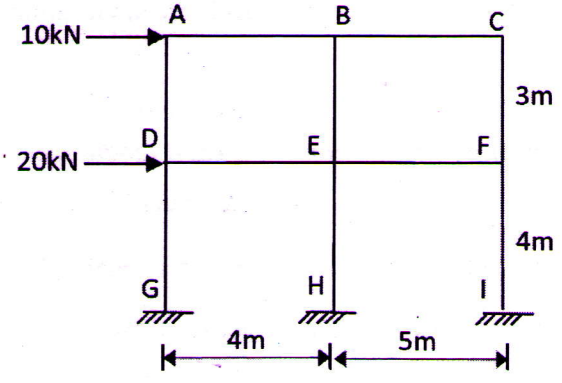
Module II

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



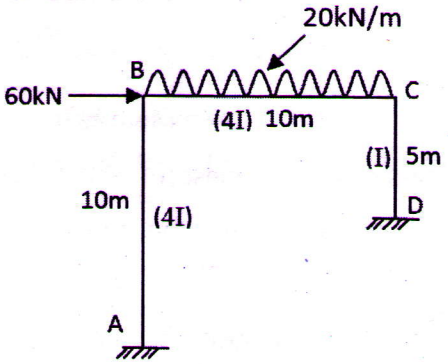
OR

5. Analyse and determine the beam and column moments for the frame shown in figure below by Portal method. Flexural rigidity EI is same for all members. (14)



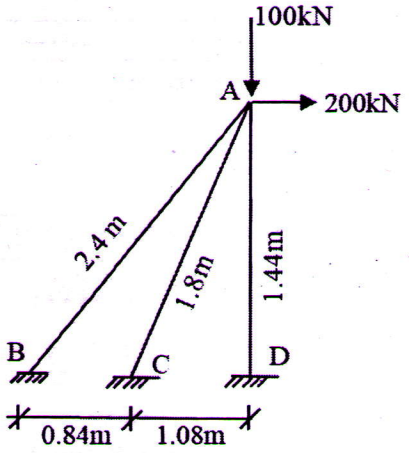
Module III

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



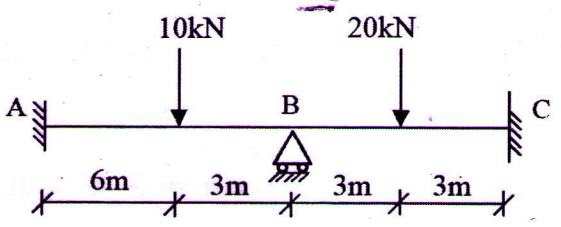
OR

7. Find the vertical and horizontal deflection at joint A for the truss shown in figure below by stiffness method. Axial rigidity AE is same for all members. (14)



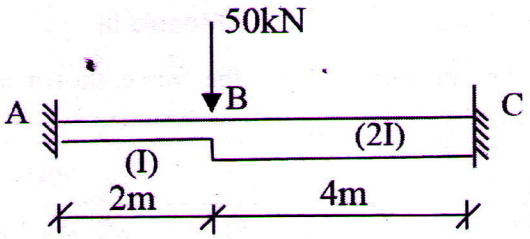
Module IV

8. Analyse the continuous beam shown in figure below by direct stiffness method and draw the BMD. Flexural rigidity EI is constant throughout the beam. (14)



OR

9. Determine the slope and deflection at B for the fixed beam shown in figure below by direct stiffness method. (14)

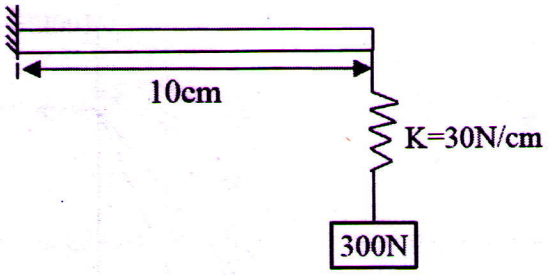


Module V

10. Derive an expression for response of SDOF system subjected to damped free vibration in 'x' direction with mass m, spring constant k and damping constant c. (14)

OR

11. Determine the natural frequency of the system shown in figure below. A weight of 300N is connected to the cantilever through a spring of stiffness 30N/cm. The beam is 3.5cm wide and 0.5cm deep in cross section and of span 10cm. Given the modulus of elasticity $E = 2\times10^5$ N/mm^2. (14)



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