A

1200CET302052302

Pages: 3

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S4 (PT) (S) Examination January 2024 (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) Differentiate between structure and mechanism with suitable examples. (3)

b) Write short note on the approximate method of analysis of multi storeyed building for vertical load. (3)

c) Differentiate between portal method and cantilever method of analysis of multi storeyed building. (3)

d) Derive flexibility matrix for the coordinates shown in Fig.1 (3)

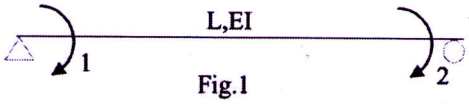

Fig.1

e) Derive stiffness matrix using physical approach for the coordinates marked in Fig.2. (3)

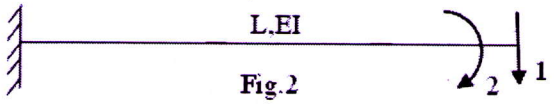

Fig.2

f) Define Nodal load, element load, and equivalent joint load. (3)

g) Explain global coordinate and local coordinate system used in matrix method of analysis. (3)

h) Obtain the transformation matrix for the linear displacements of the ends of a truss element in local and global coordinates; the member makes angle θ with the global x- direction. (3)

i) Define the term 'degrees of freedom' as used in dynamic analysis. (3)

j) Using D'Alembert's Principle derive the equilibrium equation of a dynamic system having definite mass, stiffness and damping, subjected to a time varying force. (3)

PART B

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

Module I

2 a) Determine the plastic moment capacity Mp of the continuous beam shown in Fig.3. Given AB= BC= 6m, CD = 3m and the point load 8kN is applied at the mid span of AB. (14)

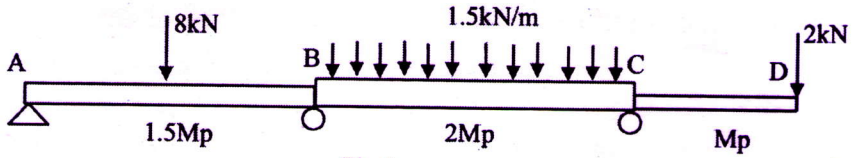

Fig.3

OR

3 a) The building frame shown in Fig.4 carries design dead load of 12kN/m and design live load of 25kN/m. Flexural rigidity EI is same for all members. Using substitute frame method, determine the maximum midspan positive moment on span FG. (14)

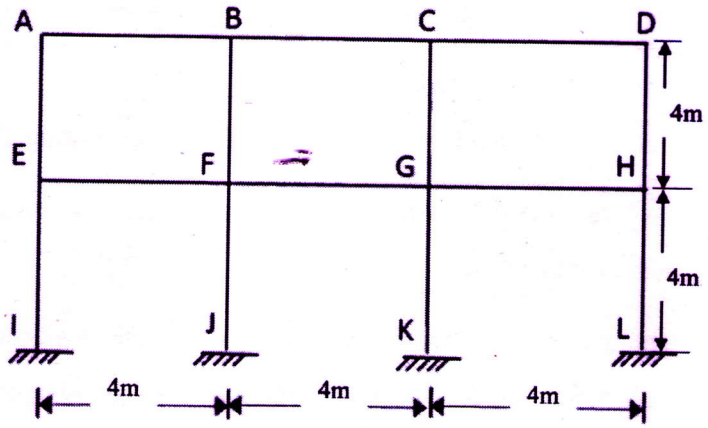

Fig.4

Module II

4 a) Analyse the beam in Fig.5 by Flexibility method and draw the bending moment diagram. Flexural rigidity of AB is twice that of BC. (14)

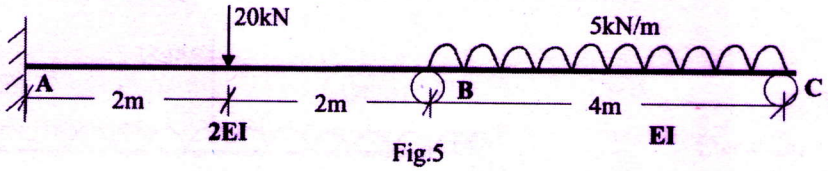

Fig.5

OR

5 a) Analyse the frame shown in Fig.6 using cantilever method. (14)

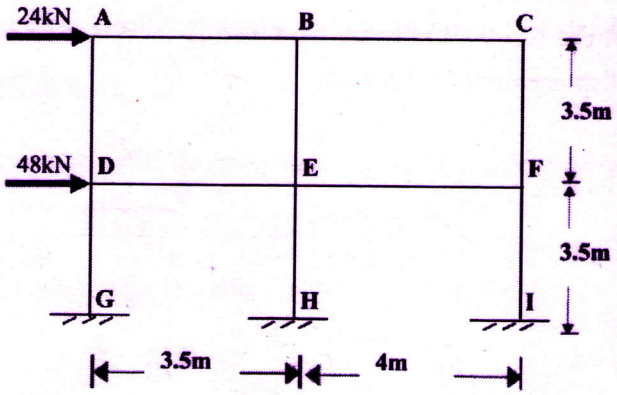

Fig.6

Module III

6 a) Analyse the frame shown in Fig.7 using stiffness method and draw the bending moment diagram. (14)

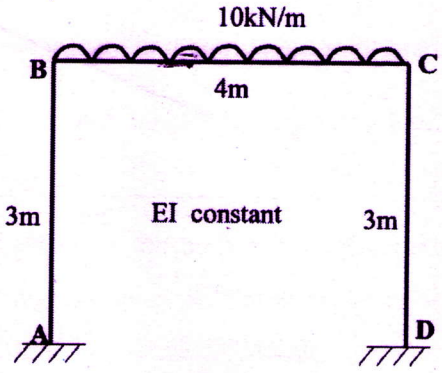

Fig.7

OR

7 a) Analyse the beam shown in Fig.8 using stiffness method and draw the bending moment diagram. Flexural rigidity is EI. (14)

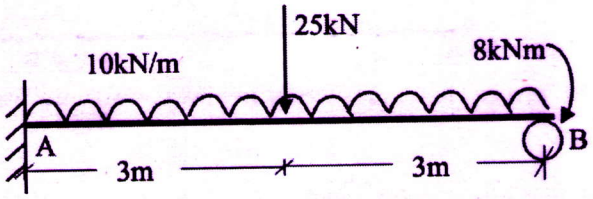

Fig.8

Module IV

8 a) Analyse the beam shown Fig.9 by direct stiffness method and get the displacements at point B. (14)

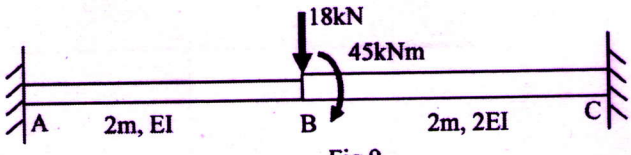

Fig.9

OR

9 a) Analyse the pin jointed truss shown in Fig.10 by direct stiffness method and get the displacements at joint B. Cross sectional area of the members = 500sqmm, E= 200GPa. (14)

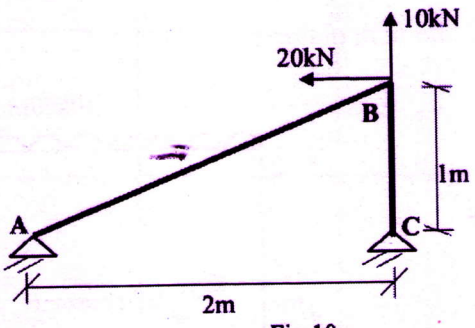

Fig.10

Module V

10 a) A simply supported beam of span 10cm supports a mass 50kg at the midspan point. The beam is of steel (E=200GPa) and has uniform cross section 25mm x 5mm. Determine the natural period of vibration of the system. If this mass is supported on a spring of stiffness 3kN/cm placed at the midspan, what will be the change in period of vibration? (14)

OR

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

****