Reg. No. : | | | | | | | | | | |

Question Paper Code: 45104

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Civil Engineering

14UCE504 – STRUCTURAL ANALYSIS - I

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In a frame, the number of members is sufficient to keep it in equilibrium, and then the frame is said to be

   (a) Imperfect frame (b) deficient frame
   (c) Perfect frame (d) redundant frame

2. In a truss the member forces are caused by real loads are called as

   (a) virtual force (b) nominal force
   (c) imaginary force (d) real force

3. Slope at a point in a beam is the

   (a) vertical displacement (b) angular displacement
   (c) horizontal displacement (d) none of these

4. The bending moment value at simply supported end is

   (a) Max (b) zero (c) not equal to zero (d) one

5. In general slope at Fixed end support is

   (a) Max (b) zero (c) not equal to zero (d) one

6. The proportions of the unbalanced moments carried by each of the members is called as

   (a) Distribution factor (b) Stiffness factor
   (c) Flexibility factor (d) Slope deflection factor

7. Select the correct statement

(a) Flexibility matrix is a square symmetrical matrix

(b) Stiffness matrix is a square symmetrical matrix

(c) Both (a) and (b)

(d) None of these

8. The method of column analogy in structural analysis falls in the category of

(a) displacement method (b) stiffness method

(c) flexibility method (d) finite element method

9. Stiffness method in structural analysis is also known as

(a) consistent-deformation method (b) unit load method

(c) force method (d) displacement method

10. Static indeterminacy for fixed beam is

(a) 0 (b) 3 (c) 4 (d) 2

PART - B (5 x 2 = 10 Marks)

11. Distinguish between pin jointed and rigidly jointed structure.

12. Write the general slope deflection equation.

13. Define relative stiffness factor.

14. Define static indeterminacy.

15. Define stiffness coefficient k_{ij}.

PART - C (5 x 16 = 80 Marks)

16. (a) Using the principle of virtual work, determine the vertical and horizontal deflection components of joint *C* of the truss in figure 1. E = 200 x 10^6 kN/m^2 and cross sectional area of each bar = 150 x 10^{-6} m^2. (16)

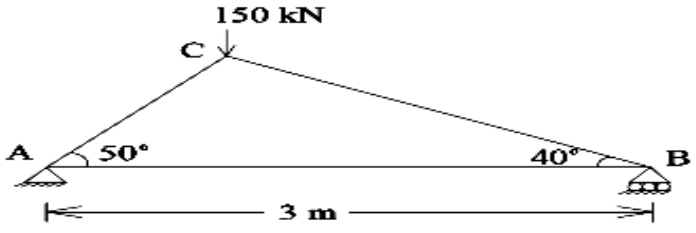
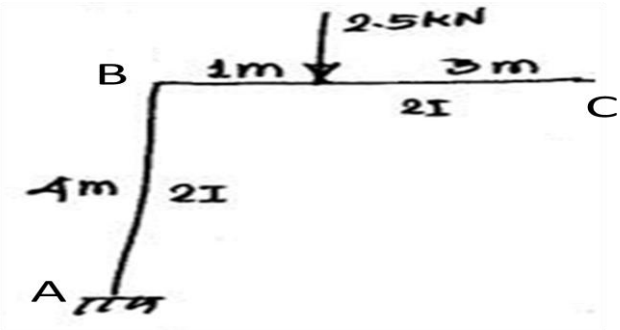


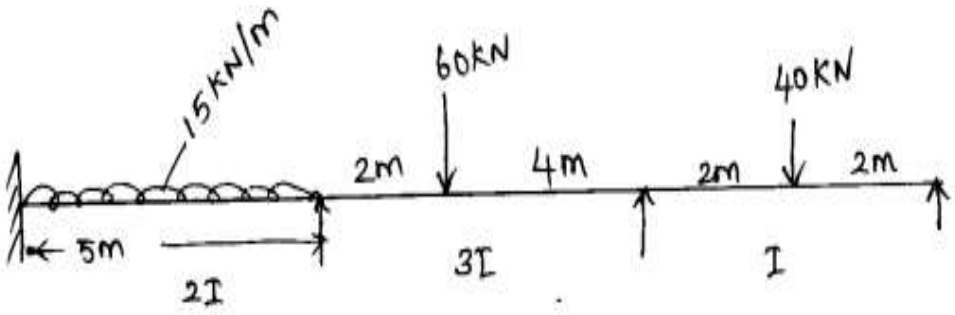
Figure 1

Or

(b) Determine the vertical deflection at the free end of frame shown in figure by unit load method. (16)



17. (a) Analyse the continuous beam given in figure. By slope deflection method and draw the B.M.D. (16)



Or

(b) Analyse the portal frame loaded as shown in figure 4 by slope deflection method and sketch the bending moment and shear force diagrams. (16)

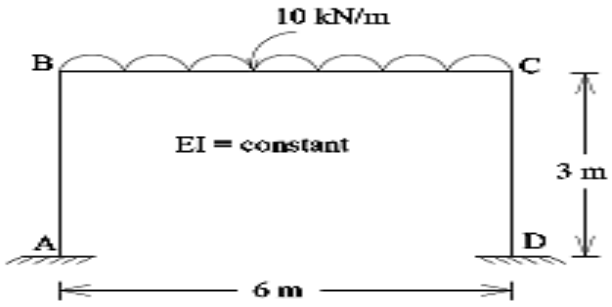


Figure 4

18. (a) Analyse the continuous beam loaded as shown in figure 5 by the method of moment distribution. Sketch the bending moment and shear force diagrams. (16)

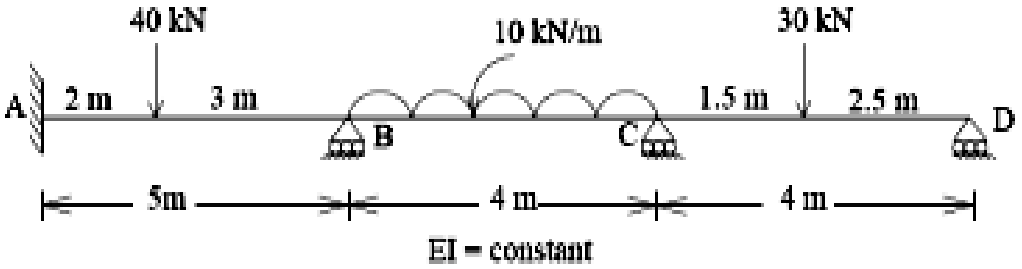
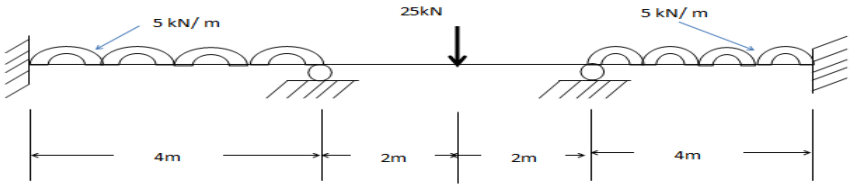


Figure 5

Or

(b) Draw the bending moment diagram and shear force diagram for the continuous beam shown in figure by moment distribution method. (EI is constant). (16)

19. (a) Analysis the continuous beam as shown in figure given below by flexibility method. (16)



Or

b) Analysis the pin-jointed plane frame shown in figure 8 by flexible matrix method. The members in parenthesis are cross-section areas of the members in mm^2. (16)

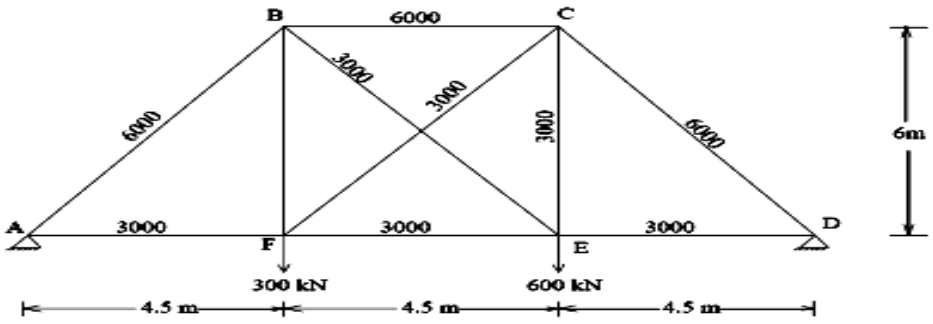
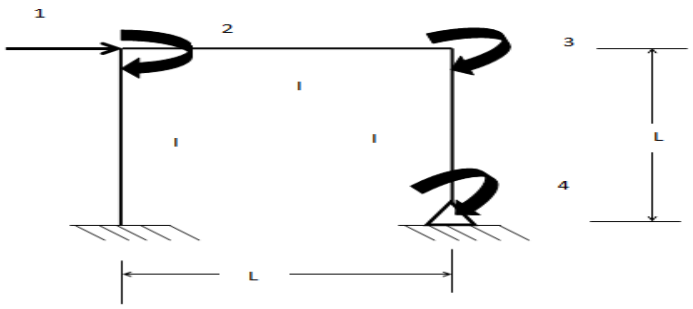


Figure 8

20. (a) Generate the stiffness matrix for the figure given below with co- ordinates as shown. (16)



Or

(b) Analysis the beam as shown in below by stiffness method, EI is constant. (16)