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

Question Paper Code: 45104

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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. Maximum slope in a simply supported beam with point load at center will be

   (a) at the supports (b) at the center
   (c) in between the support and the center (d) none of these

5. Distribution factor is the ratio of

(a) relative stiffness / sum of relative stiffness at joint
(b) carry over factor/sum of the factors
(c) relative stiffness / flexural rigidity
(d) none of these

6. If far end is fixed, then the carry over factor in a prismatic member is

(a) 0.5 (b) 0.25 (c) 0.6 (d) 0.1

7. Flexibility of a member is defined as

(a) Force / displacement (b) displacement / force
(c) L/AE (d) AE/L

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. Name any four methods used for computation of deflection in structures.

12. State the assumptions made in slope deflection method.

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)

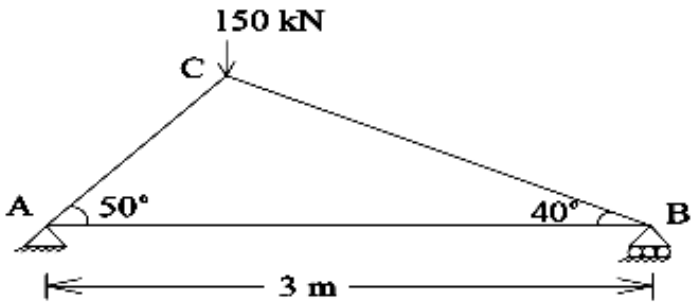
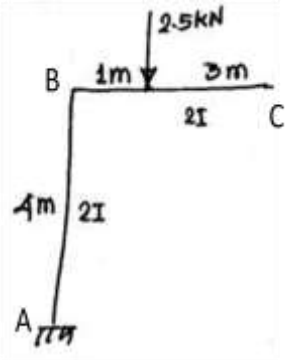


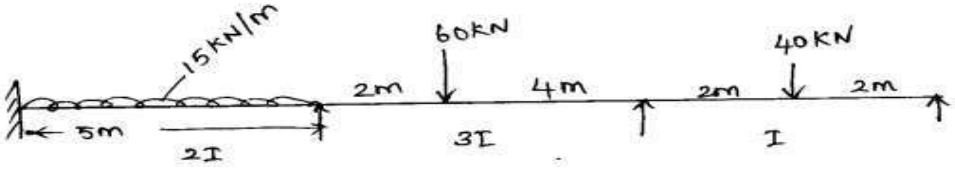
Figure 1

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)

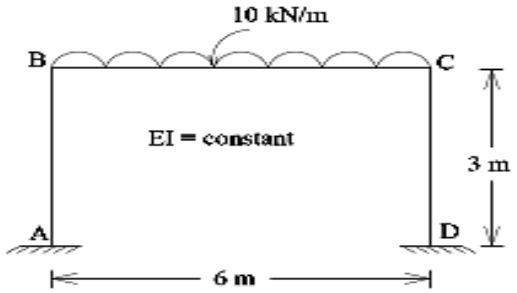


Figure 4

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)

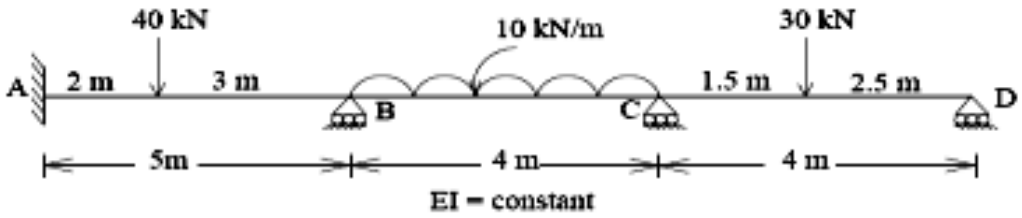
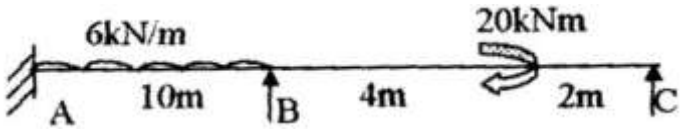


Figure 5

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 shown in figure 7 using flexibility matrix method. (16)

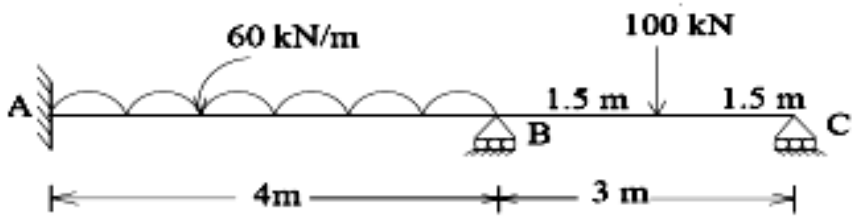
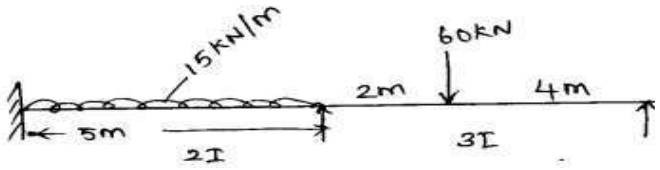


Figure 7

Or

(b) Analyse the continuous beam shown in figure by flexibility matrix method. (16)



20. (a) Analysis the continuous beam shown in figure 9 using stiffness matrix method. (16)

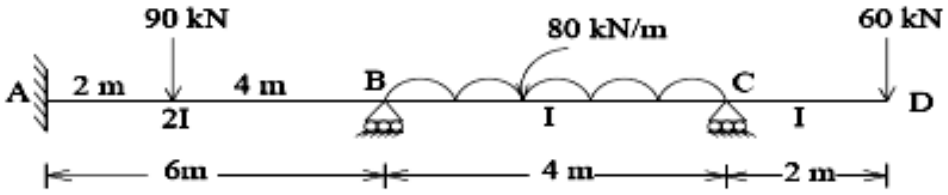


Figure 9

Or

(b) Analyse the continuous beam shown in figure by displacement method.

(16)