

# CE 010 506 STRUCTURAL ANALYSIS I

## V semester Civil Engineering

Model Question Paper

Answer All Questions

Time : 3Hrs

Max marks: 100

### Part A

1. Explain Statical Indeterminacy
2. Explain the situations where displacement method is preferred over force method
3. Explain the terms relative stiffness and absolute stiffness
4. Define flexibility. What are flexibility influence coefficients?
5. Explain discretization in Finite Element approach

( 5×3=15 mks)

### Part B

6. Explain Clayperon's theorem of three moments.
- 7.(a) Formulate the moment equations in Slope Deflection method  
(b) List the reasons due to which the Portal Frames may sway.
8. Derive the stiffness matrix of the following structure (Fig.1.) with reference to the co ordinates as shown

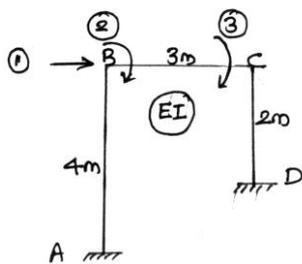


Fig.1

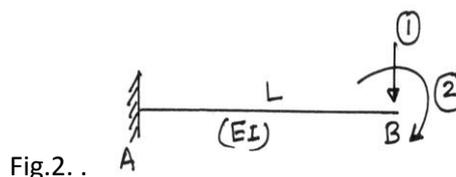


Fig.2. .

9. Derive the flexibility matrix of the structure shown.(Fig.2.)
10. What are Interpolation functions?

(5×5=25 mks)

**Part C**

11. Analyse the beam shown in Fig.3. by Consistent Deformation method and draw the shear and moment diagrams

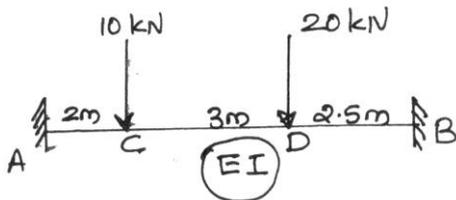


Fig.3.

OR

12. Analyse the continuous beam shown in Fig.4. by Clayperon's theorem of three moments.

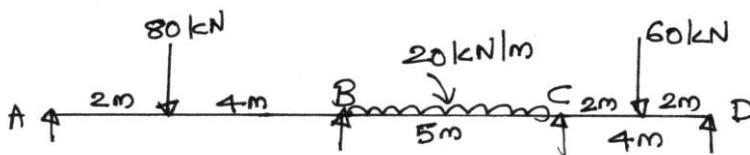


Fig.4.

13. A portal frame ABCD is fixed at A and D, and has rigid joints at B and C. The Column AB is 3 m long and column CD, 2 m long. The beam BC is 2 m long and is loaded with uniformly distributed load of intensity 6kN/m. The moment of inertia of AB is 2I and that of BC and CD is I. Analyse by slope deflection method and plot moment diagram.

OR

14. A continuous beam is loaded as shown in Fig.5. End A is fixed and End D is simply supported. Determine the bending moments at the supports by Moment Distribution method and plot the bending moment diagram.

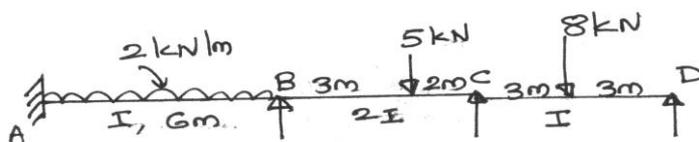


Fig.5.

15. Analyse the frame shown in Fig.6. by Stiffness method and draw the deflected shape.

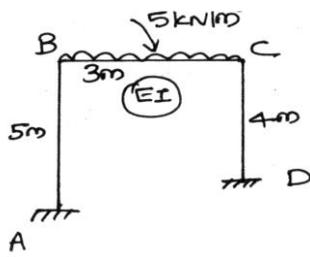


Fig.6

OR

16. Using stiffness method, analyse the beam shown in Fig.7. and draw the moment diagram.

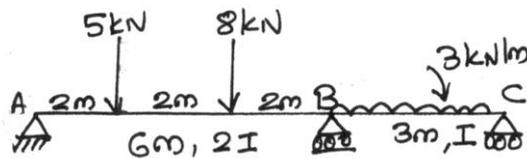


Fig.7.

17. Analyse the structure shown in Fig.8. by flexibility method

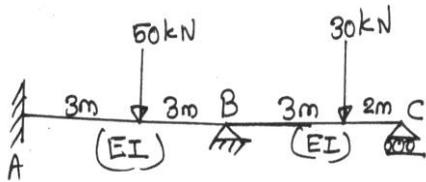


Fig.8.

OR

18. By flexibility method, analyse the beam shown in Fig.9.

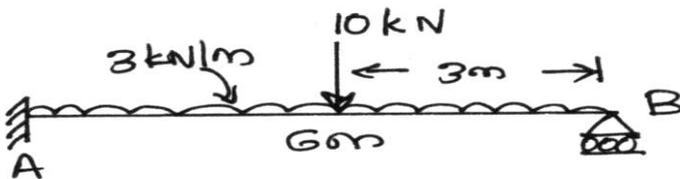


Fig.9

19. Explain in detail the general procedure of FEA

OR

20. (a) What are Interpolation functions? (b) Derive the shape functions for a linear model triangular element.

(5×12=60 mks)