Roll No. | | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 08

Ph.D in Faculty of Engineering (CE)

ADVANCE STRUCTURE ANALYSIS

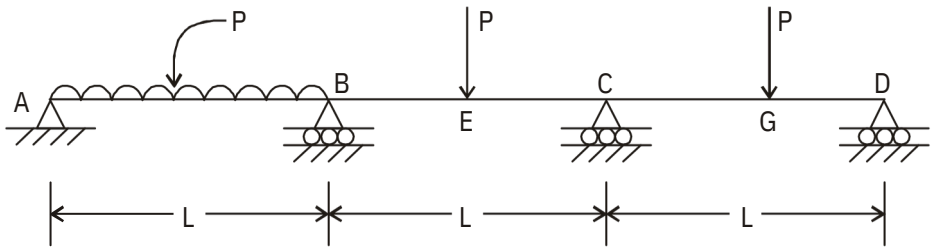
M.Code : 77351

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT question.
2. Each question carry TWENTY marks.

1. By Flexibility Matrix Method, find the reactions of the continuous beam shown in Fig.1. Use redundants at B & C. Assume EI = constant.

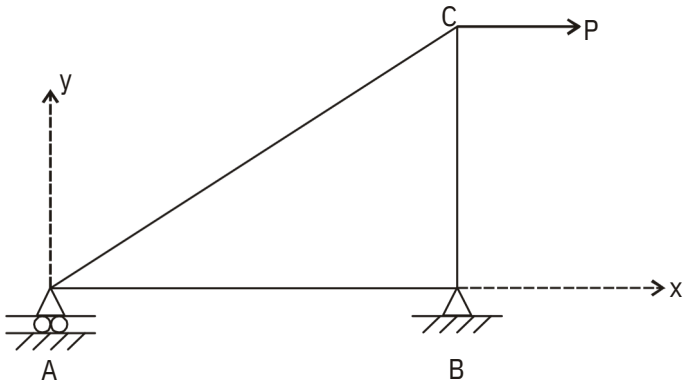


BE=EC=L/2

CG=GD=L/2

Fig. 1

2. Determine the displacements in x & y directions at joint C of the plane truss shown in Fig. 2. EA = constant for all the members.

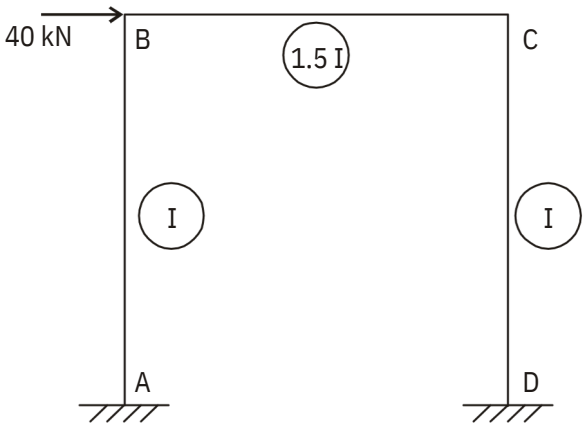


AB = L

BC = 0.7L

Fig. 2

3. Analyse the frame shown in Fig. 3.



AB = 5m
BC = 4m
CD = 5m
Fig. 3

4. Derive stiffness matrix in axis shown for the Grid shown in Fig. 4. Analyse assuming 30 kN load acting at joint.

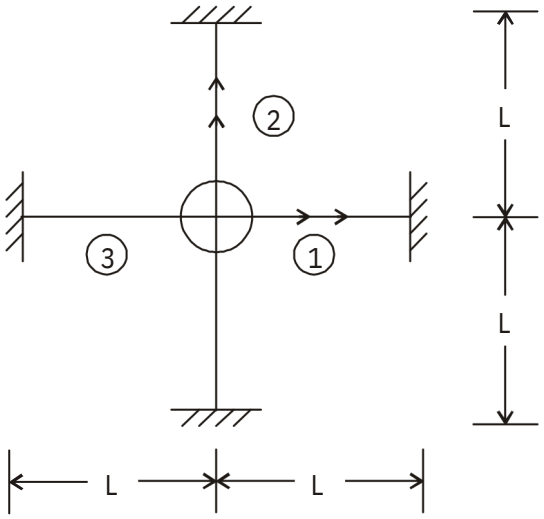


Fig. 4

5. Starting from basics, derive the differential equation for the bending of a beam. Take $\varepsilon_y = \gamma_{xy} = 0$. Assume that strains vary linearly along the depth of a beam. Integrate the stresses over the cross-section and obtain the Bending Moment and Shear Forces. Relate them to strain parameters at neutral axis.

6. Write short notes on :

(a) Lack of Fit.

(b) Effect of support settlements.

7. The heat dissipation in a fir of uniform cross-section is given by

$$\frac{d^2T}{dx^2} - \frac{hP(T - T_\infty)}{kA} = 0$$

With T = T6 at x = 0, $\frac{dT}{dx} = 0$ at x = L. Solve this equation by Galerkin's Method.

8. A cantilever beam is shown in Fig. 5. Compute the deflection at free end by using Rayleigh Ritz Procedure. Compare the results with one, two and three parameter solutions by using

(a) Algebric Polynomials.

(b) Trignometric Functions.

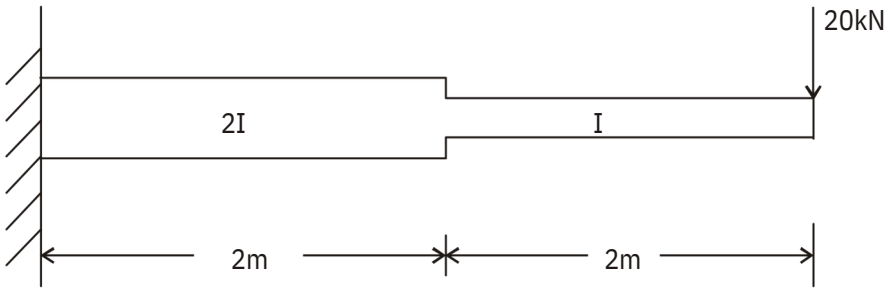


Fig. 5

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.