(Pages : 3) **M – 6021**

Reg. No. : ....

Name : ....

Fourth Semester B.Tech. Degree Examination, December 2021

08.403 : STRUCTURAL ANALYSIS — I (C)

(2008 Scheme)

Time : 3 Hours Max. Marks : 100

Answer all questions of Part A and any one question from each module of Part B.

PART – A

1. Derive the slope and deflection of the free end of a cantilever, by double integration, subjected u.d.l.

2. Explain the principle of super position.

3. Explain strain energy and complementary energy.

4. Explain the principle of minimum total potential energy.

5. Determine the horizontal thrust of a three hinged parabolic arch carrying u.d.l. for entire span.

6. Explain the method of tension coefficients.

7. Derive the expression for Euler's crippling load for column with both ends fixed.

8. Explain absolute maximum shear force and bending moment.

(8 × 5 = 40 Marks)

P.T.O.

PART – B

Module – I

9. A simply supported beam is subjected to equal loads 'W' at each of 1/3rd span points. Determine the deflection under the load and at centre. 20

OR

10. Find the slope and deflection at the free end of a cantilever loaded as shown in figure. (1) by moment area method. Use $E=2\times10^5$ N/mm^2 and $I=15\times10^6$ mm^4. 20

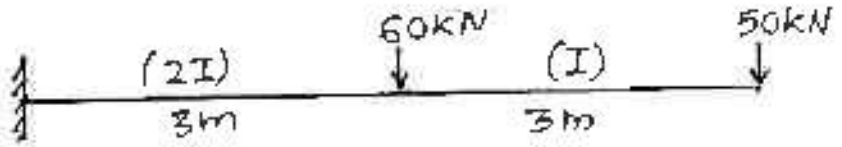

Figure 1

Module – II

11. Figure (2) shows pin-jointed truss. Area of cross-section of all members is 1200 mm^2. Determine the vertical deflection of point c. $E=2\times10^5$ N/mm^2. 20

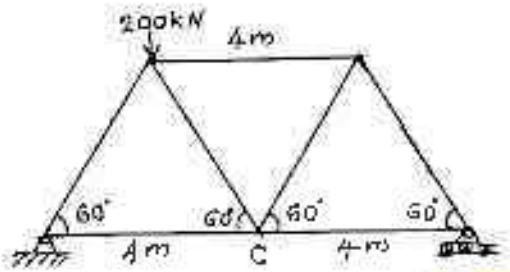

Figure 2

OR

12. Find the horizontal and vertical deflection at the free end of a rigid jointed frame shown in figure (3) by the principle of virtual work. $E = 2 \times 10^5 N/mm^2$ and $I = 3 \times 10^6 mm^4$.

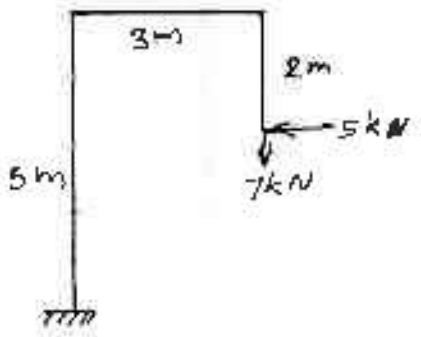

Figure 3

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Module – III

13. (a) Derive Euler's buckling load for slender columns with one end fixed and other hinged.

(b) A solid round bar of 60 mm diameter and 3 m long is used as a strut. Find the safe compressive load for the strut using Euler's formula. Both the ends of the strut are hinged. $E = 2 \times 10^5 N/mm^2$ and factor of safety = 3. **20**

OR

14. A train of wheel loads 10, 8, 12, 15 and 20 kN moves on a girder of span 20 m with 20 kN load leading. Distance between each load is 2 m. Find absolute max. B.M. in the beam. **20**