Roll No. | | | | | | | | | | |

ANNA UNIVERSITY :: CHENNAI

(UNIVERSITY DEPARTMENTS)

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, MAY 2013

CIVIL ENGINEERING

VI Semester

CE 93 51 STRUCTURAL ANALYSIS-II

(Regulation 2008)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define: Influence lines
2. State the uses of influence line diagrams
3. Sketch the influence line diagram for shear force at any section of a simply supported beam
4. State: Muller-Breslau's Principle
5. What is the degree of static indeterminacy of a three hinged parabolic arch?
6. A symmetrical two hinged arch (circular) supports a load 'W' at the crown. What is the value of H?
7. Define: Tension coefficient
8. Give the expression for temperature stresses in suspension cable.
9. Define: Plastic modulus
10. State the conditions of plastic analysis

PART-B (5 x 16 = 80 marks)

11. The three hinged stiffening girder of a suspension bridge of 110 m is subjected to two point loads of 15 kN each placed at 22 m and 44 m respectively from the left hand hinge. Determine the B.M. and S.F. in the girder at section 33 m from each end. Also determine the maximum tension in the cable which has a central dip of 11 m.

12. a) Two point loads of 60 kN and 80 kN spaced 2.5 m apart cross a girder of span 15 m from left to right with the 60 kN load leading. Determine the maximum values of shear force and bending moment that can occur at any point of the girder using influence lines. Also plot the maximum positive and negative shear force and bending moment diagrams stating their absolute maximum values.

OR

b) A single rolling load of 100 kN moves on a girder of span 20m. (a) Construct the influence lines for (i) Shear force and (ii) Bending moment for a section 5m from the left support. (b) Construct the influence lines for points at which the maximum shears and maximum bending moment develop. Determine these maximum values.

13. a) Using Muller Breslau's Principle Determine the influence line for the shear force at D, the middle point of span BC, of a continuous beam ABC shown in Fig. 13.a. Compute the ordinates at every quarter point of each span.

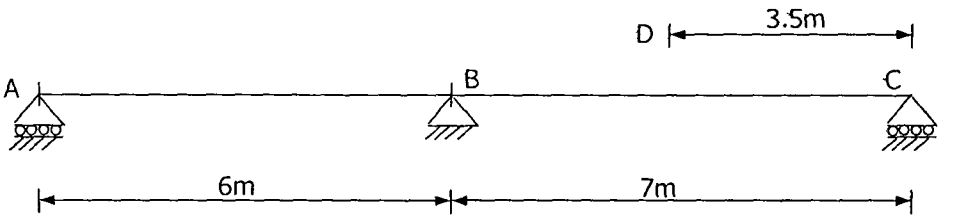

Figure 13.(a)

OR

b) Using Muller Breslau Principle, compute the influence line ordinates for (i) Reaction at B and (ii) Moment at A for the propped cantilever shown in Figure 13(b) for a point 6.25 m from A.

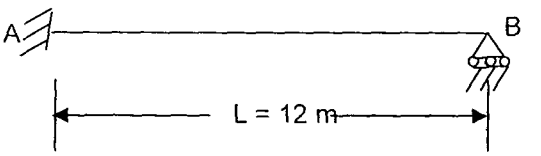

Figure 13(b)

14. a) A two hinged parabolic arch of span 25 m and central rise 4m carries a uniformly distributed load of 15 kN/m over the left half of the span. Determine the position and value of maximum bending moment. Also find the normal thrust and radial shear force at the section. Assume that the moment of inertia at a section varies as secant of the inclination at the section.

OR

b) A two hinged semi-circular arch of uniform section is hinged at the abutments which are at the same level. It carries a point load W at the crown. Find the horizontal thrust at the abutments.

15. a) Find the value of W at collapse for the portal frame loaded as shown in Fig. 15.a.

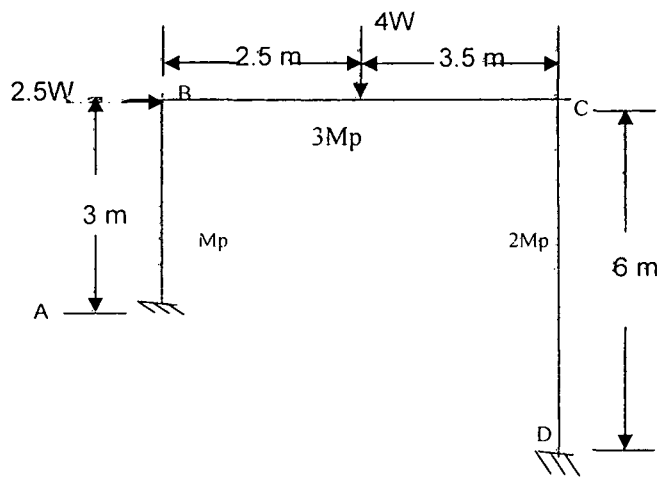

Figure 15.(a)

OR

b) Find the value of W at collapse for the portal frame loaded as shown in Figure 15(a). All the members have the same plastic moment of resistance.

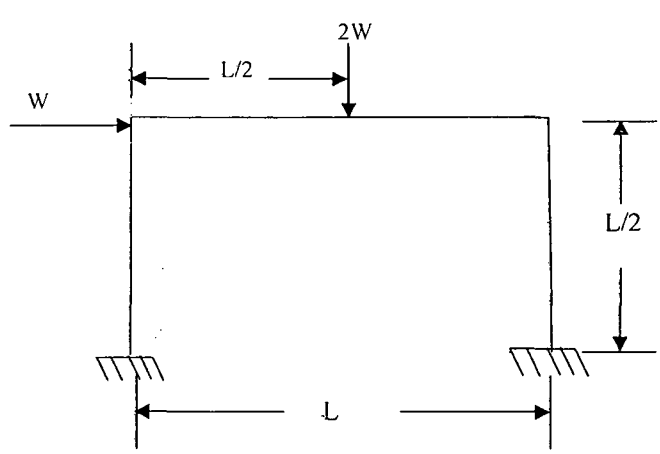

Figure 15.(b)