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

B.E / B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

CIVIL ENGINEERING

IV Semester

PTCE 382/ PTCE 336/ PTCE 9351 STRUCTURAL ANALYSIS-II

(Regulation 2002/2005/2009)

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

PART-A (10 x 2 = 20 Marks)

1. Sketch the influence line diagram for shear force at any section of a simply supported beam
2. List the uses of influence lines
3. Differentiate statically determinate and indeterminate structures with examples
4. State: Muller-Breslau Principle
5. What is the degree of static indeterminacy of a two hinged circular arch?
6. What are the types of arches?
7. Write the expression for Horizontal thrust for a three hinged semi-circular arch if a load of W is applied at the centre
8. State the functions of stiffening girders in suspension bridges.
9. Define: Plastic hinge
10. Give the shape factor for a hollow circular section

Part – B (5 x 16 = 80 marks)

11. Construct the influence line for the force in member L_2U_3 of the bridge truss shown in Figure Q11.a.

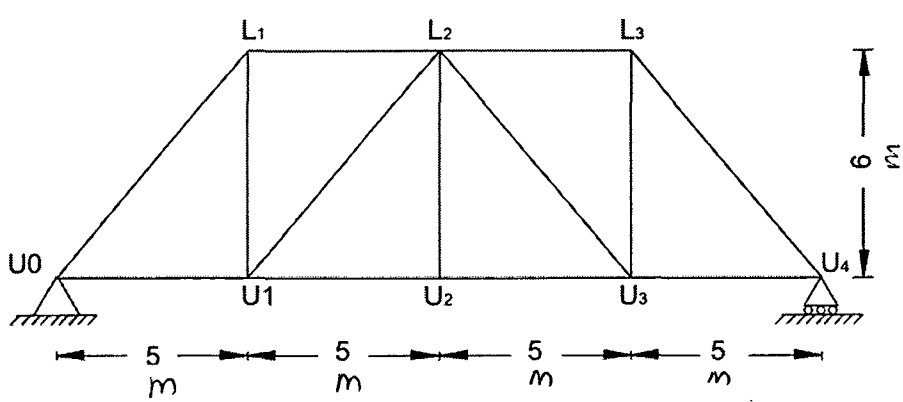

Figure Q11.(a)

12. a) Using Muller Breslau's Principle, determine the influence line ordinates at any section X on BC of the continuous beam ABC shown in Figure Q12.a, for reaction at A.

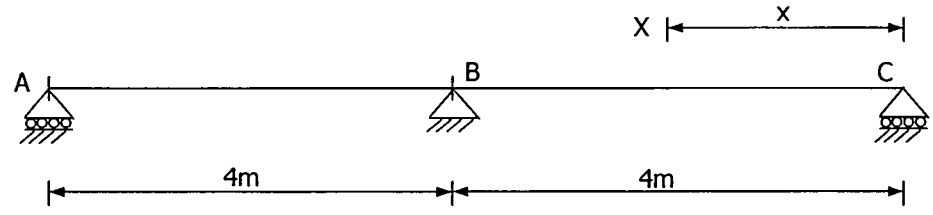

Figure Q12.(a)

(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 Q12(b) for a point 3.5 m from A.

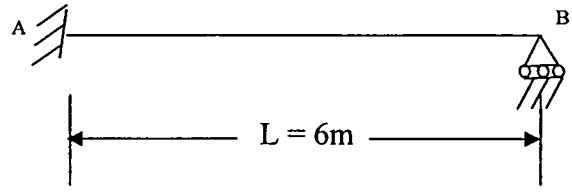

Figure Q12(b)

13. a) A two hinged parabolic arch of span 25m and central rise 4m carries a uniformly distributed load of 16kN/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 parabolic arch fixed at both ends has a span of 40 m and a central rise of 8.0m. It is subjected to concentrated loads of 72 kN and 90 kN at 6 m and 12 m respectively from the left end. The moment of inertia of the arch rib varies as the secant of the inclination of the rib axis. Analyse the arch and find the bending moments at either support and at the crown.

14. a) A light cable hangs between two points separated horizontally by a distance of 100m and vertically 20 m. It carries three vertical loads of magnitude 40, 50 and 20 kN at a distance of 25, 50 and 75 m horizontally from left support respectively. Determine the cable profile and length of cable required. The diameter of the cable is 25 mm and allowable tensile stress is 180 N/mm^2. Neglect self weight of the cable.

(OR)

b)) Find the bending moment at midspan of a semicircular beam loaded at the midspan with a concentrated load of 80 kN (Figure Q 14.b). The beam is fixed at both supports. Find the maximum bending moment and maximum torque in the beam.

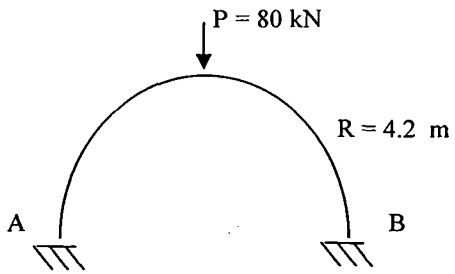

Figure Q14(b)

15. a) Determine the plastic moment capacity of the section required for the frame shown in Figure Q15.a. The loads shown are the working loads. Take Load factor as 1.75. Assume same plastic moment capacity for all the members.

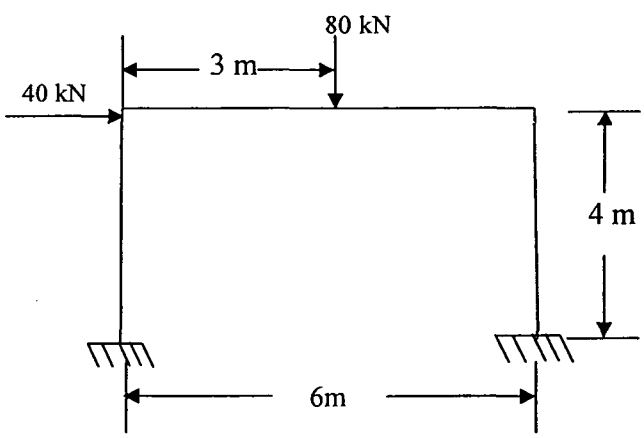

Figure Q15.a

(OR)

b) A propped cantilever of 4.5 metres span carries a uniformly distributed load of 22 kN/m. A 225 mm x 150 mm joist, (thickness of flange 9.9 mm, thickness of web 6.4 mm) is used for the beam. Calculate the load factor, taking the yield stress as 260 N/mm^2. State the location of the plastic hinge in the span at collapse loading.