Reg. No. : | | | | | | | | | | |

Question Paper Code: 41164

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Civil Engineering

14UCE604 - STRUCTURAL ANALYSIS II

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The shape of the influence line diagram for the maximum bending moment in a simply supported beam is

   (a) Rectangular (b) Triangular (c) Parabolic (d) Circular

2. The influence line for any stress function are used for obtaining the maximum value due to

   (a) Single point load only (b) Uniform live load only
   (c) Several point loads (d) All the above

3. The Muller-Breslau principle for influence line is applicable for

   (a) Simple beam (b) Continuous beam
   (c) Redundant beam (d) All the above

4. The area of the influence line diagram for the fixed end moment of a fixed beam of span L is

   (a) $L^2/8$ (b) $L^2/12$ (c) $L^2/16$ (d) $L^2/24$

5. A two-hinged arch is

   (a) Statically determinate (b) Statically determinate of 1 degree
   (c) Statically determinate of 2 degree (d) Statically determinate of 3 degree

6. Shape of the influence line diagram for horizontal thrust in a symmetric three – hinged parabolic arch is

(a) Rectangle (b) Triangle (c) Trapezoidal (d) Parabolic

7. A cable resists the external loads by

(a) Tension (b) Compression
(c) Bending (d) Compression and Bending

8. The shape of the cable under horizontal uniform distributed load is

(a) Parabolic (b) Catenary (c) Circular (d) Triangular

9. The shape factor of a rectangular section is

(a) 0.5 (b) 1 (c) 1.5 (d) 2

10. The moment capacity of a section at plastic hinge is

(a) Zero (b) Yield moment
(c) Twice of Yield moment (d) Fully plastic moment

PART - B (5 x 2 = 10 Marks)

11. What are the uses of influence line diagrams?

12. State Muller-Breslau principle.

13. Distinguish between two hinged and three hinged arches.

14. Differentiate between the basic action of an arch and a suspension cable.

15. Define shape factor.

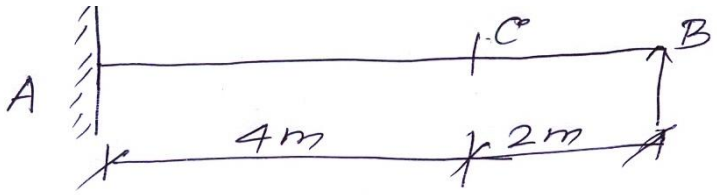
PART - C (5 x 16 = 80 Marks)

16. (a) In a simply supported girder AB of span 20 m, determine the maximum bending moment and maximum shear force at a section 5 m from A, due to the passage of a uniformly distributed load of intensity 20kN/m, longer than span. (16)

Or

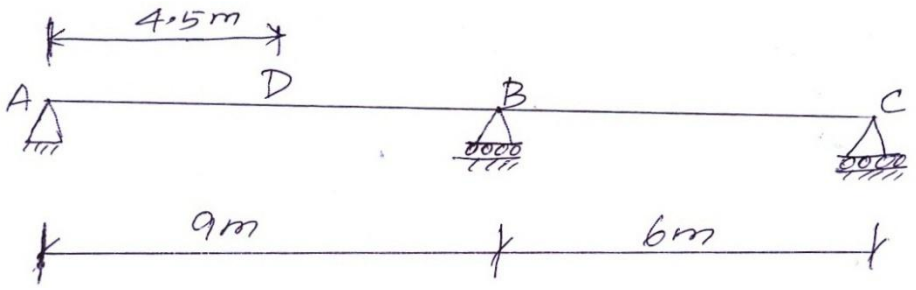
(b) Four equal loads of 150 kN, each equally spaced 2 m apart followed by a uniformly distributed load of 60 kN/m at a distance of 1.5 m from the last 150 kN load cross a girder of 20 m span from right to left. Using influence lines, calculate the shear force and bending moment at a section 8 m from the left hand support when the loading 150 kN load is at 5 m from the left hand support. (16)

17. (a) Draw the influence line for the moment at C of the propped cantilever shown below figure. Compute the ordinates at 1 m intervals. (16)



Or

(b) Using Muller Breslau principle, draw the influence line for bending moment at the mid-point D of span AB of the continuous beam ABC shown in figure. Determine the influence line ordinates at suitable intervals and plot them. (16)



18. (a) A three hinged parabolic arch of horizontal span 48 m has a central rise of 10 m. It carries uniformly distributed load of 20 kN/m run over the middle 16 m length of the span. Calculate the radial shear force, normal thrust and bending moment at 20 m from the left support. (16)

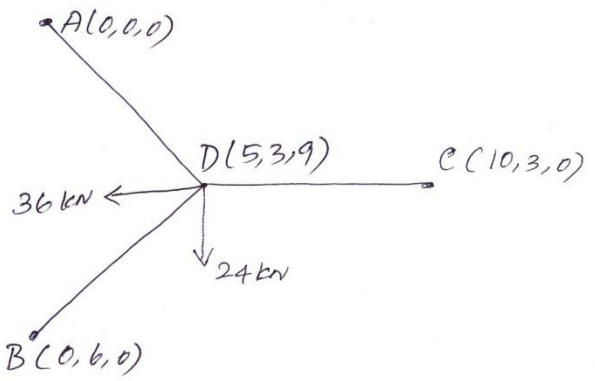
Or

(b) A parabolic arch hinged at the ends has a span of 60 m and a rise of 12 m. A concentrated load of 8 kN acts at 15 m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section. (16)

19. (a) A suspension cable is supported at 2 points 25 m apart. The left support is 2.5 m above the right support. The cable is loaded with a uniformly distributed load of 10 kN/m throughout the span. The maximum dip in the cable from the left support is 4 m. Find the maximum and minimum tensions in the cable. (16)

Or

(b) Determine the forces in the members of the space frame, the plan view of which is shown in figure by the tension coefficient method. (16)



20. (a) A two span continuous beam ABC has span lengths AB = 6 m and BC = 6 m and carries a uniformly distributed load of 30 kN/m completely covering the spans AB and BC. A and C are simple supports. If the load factor is 1.80 and the shape factor is 1.15 for the 'I' section, find the section modulus needed. Assume yield stress for the material as 250 N/mm^2. (16)

Or

(b) Determine the collapse load for the portal frame loaded as shown in figure. (16)