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

Question Paper Code: 46104

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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

33. In the influence diagram for S.F at a section in a simply supported beam, the sum of maximum –ve ordinate and maximum +ve ordinate will be

   (a) 0 (b) 2 (c) 1 (d) none of these

4. Application of influence lines

   (a) Bridges (b) Framed structures
   (c) Steel structures (d) All the above

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. Two hinged suspension bridges is

(a) Statically in determinate second degree (b) Statically determinate
(c) Statically determinate first degree (d) Statically in determinate

8. Which method used for analysis of space trusses

(a) Method of joint (b) Method of section
(c) Graphical method (d) Tension coefficient method

9. The ratio of shape factor

(a) Z_p / Z_e (b) Z_e / Z_p (c) M_p / M_e (d) All the above

10. What is the value of Shape factor for rectangle section

(a) 0 (b) 4 (c) 1.5 (d) 3

PART - B (5 x 2 = 10 Marks)

11. What are the uses of influence line diagrams?

12. State Muller-Breslau principle.

13. Under what conditions will the bending moment in an arch be zero Throughout.

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

15. Define shape factor.

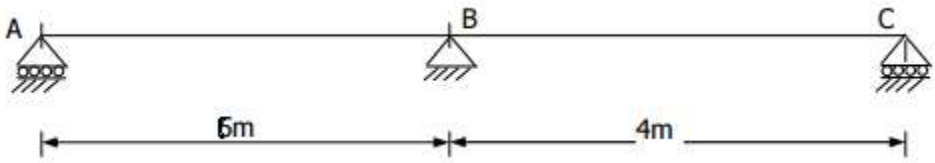
PART - C (5 x 16 = 80 Marks)

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

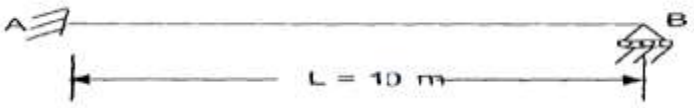
(b) A uniformly distributed load of 2 kN/ m the distance of 5 m moves on a girder of span 20m moves from left to right. Determine (i) Maximum Shear force at 8m from left end support (ii) Maximum Bending moment 8m from left end support (iii) Find absolute bending moment. (16)

17. (a) Determine the influence line ordinates at any section X on BC of the continuous beam ABC shown in below figure, for reaction at B. span AB = 6m and BC = 4m and interval at 2m. (16)



Or

(b) Using Muller Breslau Principle, compute the influence line ordinates for every 2m interval (i) Reaction at B and (ii) Moment at A for the propped cantilever shown in below figure. (16)



18. (a) A three hinged symmetric parabolic arch hinged at the crown and springing, has a span of 36 m with a central rise of 8m. It carries a distributed load which varies uniformly form 4kN/m (horizontal span) over the left hand half of the span. Calculate the maximum positive and negative bending moment at quarter span from the left and right end hinge. (16)

Or

(b) A 3-hinged arch is circular, 40 m in span with a central rise of 8m. It is loaded with a concentrated load of 120 kN at 10 m from the left hand hinge. Find the (a) Horizontal thrust (b) Reaction at each end hinge (c) Positive and negative bending moment under the load. (16)

19. (a) A three hinged stiffening girder of a suspension bridge of span 120 m is subjected to two points loads of 240 kN and 300 kN at a distance of 25 m and 80 m from the left end. Find the sheer force and bending moment for the girder at distance of 40m from left end support. The supporting cable has a central dip 12m. Find maximum tension in the cable and finds the maximum sagging bending moment under the load point. (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)

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)