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

Question Paper Code: 46104

B.E. / B.Tech. DEGREE EXAMINATION, NOV 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. When a single load W moves over a simply supported beam, the maximum S.F. at a section will occur when the loads is placed

   (a) Over the section (b) At centre of span
   (c) Over the nearer support (d) Over the farther support

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

15. Define shape factor.

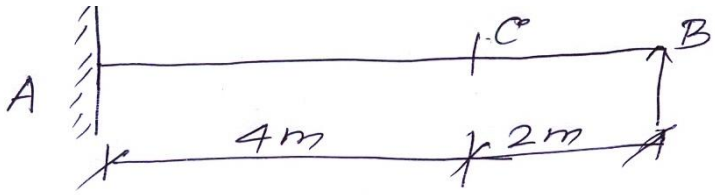
PART - C (5 x 16 = 80 Marks)

16. (a) A train concentrated rolling load of 90 kN, 120 kN, 300 kN, 270 kN and 180kN the spacing of 3m, 3m, 3m and 3m moves from left to right on a simply supported beam girder of span 30 m leading load of 18 0kN. Determine (i) Maximum positive shear force, maximum negative shear force (ii) Find absolute bending moment. (16)

Or

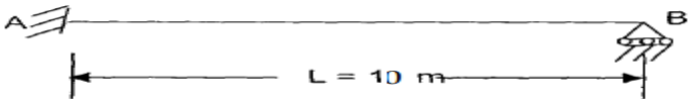
(b) A uniformly distributed load of 2 kN/ m the distance of 5 m moves on a girder of span 20m moves from left to right. Determine (i) Maximum Shear force at 8m from left end support (ii) Maximum Bending moment 8m from left end support (iii) Find absolute bending moment. (16)

17. (a) 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, 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 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 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) Find the collapse load for the given structure shown in below figure. Plastic moment is constant. (16)