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

Question Paper Code: 46104

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

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. When a single load W moves over a simply supported beam, the maximum B.M.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) None of these

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. Application of influence lines

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

5. Three hinged parabolic arch is

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

6. Maximum bending moment in arch at

(a) Over the section (b) At centre of span
(c) Over the nearer support (d) under the load point

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. 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 diagram?

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)

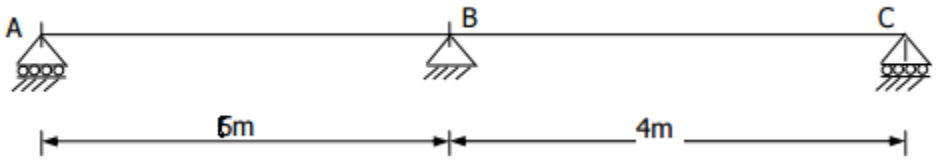
16. (a) In a simply supported girder AB of span 20 m, determine the maximum bending moment and maximum shear force at a section 5 m from A, due to the passage of a uniformly distributed load of intensity 20kN/m, longer than span. (16)

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

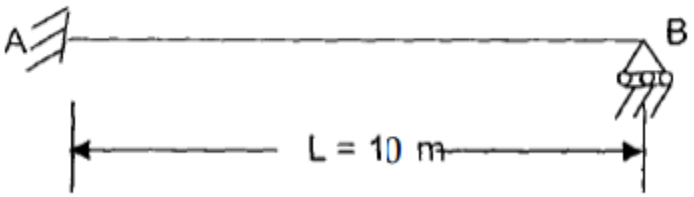
left end support (ii) Maximum Bending moment 8m from left end support (iii) Find absolute bending moment. (16)

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)

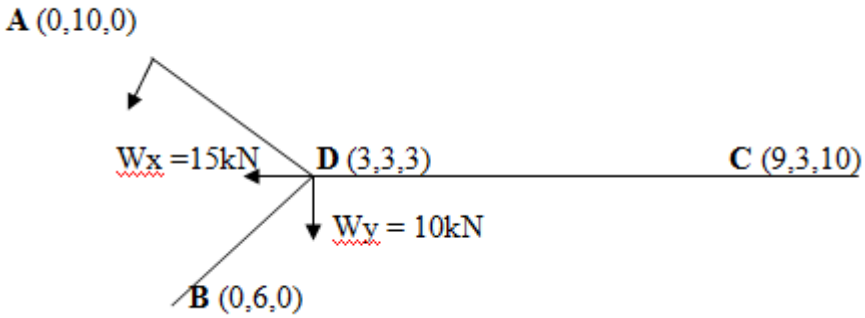
Or

(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) Analysis of space frame by tension coefficient method shown in below figure. Determine the forces in all the members. (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)