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6E 6031

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B.Tech. VI Semester (Main & Back) Examination, April - 2019
Civil Engineering
6CE1A Theory of Structures - II

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Unit - I

1. Four wheel loads of 6kN, 4kN, 8kN and 5kN cross a girder of 20 m span, from left to right followed by UDL of 4 kN/m and 4 m long with the 6 kN load leading. The spacing between loads in the same order are 3m, 2m and 2m. The head of the UDL is at 2m from the last 5 kN load. Using influence lines, Calculate the S.F. and B.M. at a section 8m from the left support when the 4kN load is at centre of the span.

(16)

(OR)

1.
   a) What is influence line? Write the uses of influence line.

   b) Explain Muller Breslau Principle.

   c) A point of 50 kNm rolls over a girder of 20 m span. Draw ILD and find maximum positive and negative shear force and bending moment at a point 8m from the left hand end.

(16)

Unit - II

2. A parabolic three hinged arch has a span of 20 m the centre of rise of the arch is 4m. It is loaded with UDL with intensity of 2 kN/m on left 8 m. Calculate: (16)

   a) Direction and Magnitude of the reaction at hinge,

   b) Bending moment, Normal thrust and Radial shear at 4 m.

(OR)

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(1)

[Contd....

2. Show that the horizontal thrust developed in a parabolic arch of span L and rise h subjected to concentrated load W at a distance a from springing is given by
$H = [5Wa(L-a)(L^2 + La - a^2)] / (8hL^3)$ (16)

Unit - III

3. A suspension cable 160 m span and 16 m central dip carries a load of 0.5 kN per lineal horizontal metre. Calculate the maximum and minimum tension in the cable. Find horizontal and vertical force in each pier under the following alternative conditions:

   a) If the cable passes over frictionless rollers on the top of the piers.

   b) If the cable is firmly clamped to saddles carried on frictionless rollers on the top of the piers. http://www.rtuonline.com

   In each case the back stage is inclined at 30° to the horizontal. (16)

(OR)

3. A light cable, 18m long is supported at two ends at the same level. The supports are 16m apart. The cable supports three loads of 8,10 and 12 N dividing the 16 m distance in four equal parts. Find the shape of the string and the tension in various portions. (16)

Unit - IV

4. Determine the principal moment of inertia for an unequal angle section 180 mm × 120 mm × 9 mm. Use analytical expression on Mohr's Circle Method. (16)

(OR)

4. The load on a bolt consists of an axial pull of 15×10^3 N together with a transverse shear of 7.5×10^3 N. Calculate the diameter of the bolt according to (16)

   a) Maximum principal stress theory,

   b) Maximum shear stress theory,

   c) Maximum strain theory,

   d) Strain energy theory,

   e) Shear strain energy theory.

Unit - V

5. a) What do you understand by Matrix method. (8)

   b) Explain Force displacement relationship. (8)

(OR)

5. a) Explain Force transformation matrix. (8)

   b) Explain Displacement transformation matrix. (8)

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