Printed Pages : 4

ECE401

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **100405**

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15
STRUCTURAL ANALYSIS - I

Time : **3** Hours]   [Total Marks : **100**

Note: Attempt all the questions, Each question carry equal marks.

1   Attempt any four of the following.

    (a)   What is the degree of static indeterminacy in trusses? Explain with example.

    (b)   What are the different methods of analysis of trusses? Explain.

    (c)   Discuss the concept of the method of tension coefficient, to analyze space trusses.

    (d)   Determine the member forces in the following truss.
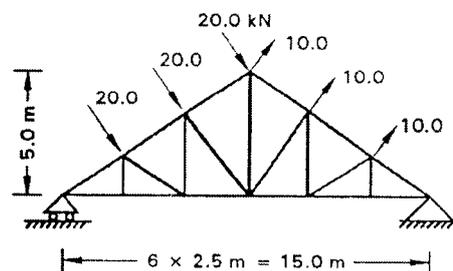
(e)   Discuss the method of section for analysis of truss, and its limitations.

(f)   Explain the method of substitution for analysis of complex truss.

2   Attempt any Two of the following.

(a)   Prove that "when a system of point loads crosses a beam, simply supported at the ends, the maximum bending moment under any given wheel load occurs when this wheel load and the centre of gravity of the total system are equidistance from the end of the beam"

(b)   A train of wheel loads crossing a beam of 20 m span from left to right with the 30 KN load leading. Calculate the maximum bending moment at 8.0 m from right support as well as the position and amount of the absolute maximum bending moment in the beam.

(c)   Three wheel loads of 100, 110, and 80 KN respectively, spaced at 5 m and followed by a uniformly distributed load of 15 KN per m rum extending over a span of 5 m starting a point 5 m behind the 80 KN load, a cross a girder of 75 m span from left to right. Calculate the shear force and bending moment at a section 30 from the right of support. Use influence Lines.

3   Attempt any two of the following.

(a)   A three hinge circular arch has a span of 100m and rise of 25 m, it is loaded with uniformly distributed load of 10 KN/m covering the central half span only, Find the maximum positive and negative bending moment in the arch, and, also calculate the normal thrust and radial shear force at the section of maximum moment.

(b) Define pressure line, and explain its significance in the analysis of arches. State and prove Eddy's theorem.

(c) Determine the maximum positive bending moment at point D, Due to a concentrated load of 10 KN and UDL of 2 KN/m moving from A to E. Use Muller Breslau's principle.
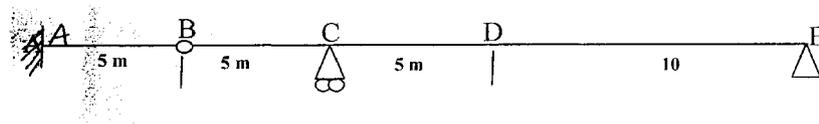
4   Attempt any two of the following.

(a) (i) A simply supported beam of uniform cross section subjected to udl. Calculate the deflection at its centre. Use strain energy method.

(ii) A simply supported beam of uniform cross section subjected to concentrated load at mid span. If span. If span of the beam is 10 m, calculate slope at its end. Use conjugate beam method.

(b) (i) Determine the slope and deflection at free end of a cantilever beam of span L, uniformly loaded with load w. Use Unit load method. EI=constant

(ii) Write statement of Castigliano' s first theorem.

(c) Write statement and prove the Maxwell's theorem.

5   Attempt any four of the following.

(a)   Discuss the mohr circle regarding unsymmetrical bending of bars.

(b)   Determine the principal moment of inertia for an unequal angle section 200 mm x 150 mm x 10 mm.

(c)   Write the assumptions in bending of curved bars with large initial curvatures.

(d)   A beam is subjected to unsymmetrical bending. Locate the neutral axis of the section

(e)   A beam of rectangular section 80 mm wide and 120 mm deep is subjected to a bending moment of 12 Kn m. the trace of plane of loading is inclined at 45^0 to the YY axis of the section. Calculate the maximum bending stress induced in the beam.

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