TCE-402 222 Printed Pages : 4

Paper ID & Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | | |

B.Tech. (CE) (IV Semester)

End Semester Examination 2015

STRUCTURAL ANALYSIS

Time: 3.00 Hours] *[Total Marks: 100*

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

Q1. Attempt any Four of the following: 4×5

(a) Draw the ILD for a simply supported beam carrying unit load at mid spam.

(b) Discuss the Muller-Breslau's principle and its applications in structural analysis.

(c) Explain Castigliano's first theorem.

(d) Discuss the method of joints for analysis of truss and its limitations.

(e) Define statically indeterminate structures with examples.

Q2. Attempt any Four of the following: 4×5

(a) Write a short note on conjugate beam method

(b) Explain the theory of equilibrium of light cables.

(c) State Betti's theorem with example.

(d) Distinguish between statically determinate and indeterminate structures

(e) A live load of 60 kN per meter long moves on a simply supported girder of span 10 m. Find the maximum bending moment which can occur at a section 4 m from left end.

Q3. Attempt any two of the following: 10×2

(a) Five wheel loads 10 kN, 20 kN, 15 kN, 16 kN, and 24 kN, spaced at 1 m interval roll on a girder of span 20 m from left to right with the 10 kN loading. Find the absolute maximum bending moment for the girder

(b) A three hinged parabolic arch of span 20 m and rise 5 m carries a triangular loading whose intensity from 15 kN/m at each abutment to zero at the crown. Find the reaction at the supports and the maximum bending moment and the section where it occurs

(c) Using strain energy method, determine the deflection of the free end of a cantilever of length "L" subjected to a concentrated load "P" at free end. EI is uniform along the length.

Q4. Attempt any Two of the following: 10×2

(a) A cable of span 100m has its ends at height 8m and 15m above the lowest point of the cable. it carries a u.d.l of 10kn/m per unit horizontal run of the span.detemine the horizontal and vertical reactions at the supports. What is the length of cable?

(b) A two hinged parabolic arch has span of 30m and a central rise of 5m.calculate the maximum positive and negative bending moment at a section distant 10m from the left support due to single point load of 10kn rolling from left to right

(c) Using strain energy method, determine the deflection of the free end of a cantilever of length L subjected to a concentrated load P at free end. EI is uniform along the length.

Q5. Attempt any Two of the following: 10×2

(a) A bridge cable is suspended from towers 80m apart and carries a load of 30kn/m on the entire span if the maximum sag is 8m.calculte the maximum tension in cable. if the cable is suspended by saddles which are stayed by wires inclined at 30° to the horizontal .determine the forces acting on the tower .if the same inclination of back stay passes over pulley. Determine the force on towers

(b) A simply supported beam has a span of 15m.A u.d.l of 40kn/m and 5m long crosses the girder from left to right. Draw the ILD for shear force and bending moment at a section 6m from left end .calculate the maximum shear force and bending moment at this section.

(c) Distinguish between the following

(i) Plan trusses and space trusses.

(ii) Complex and compound trusses.

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