Total No. of Questions : 8]   [Total No. of Printed Pages :2

Roll No ....

MVSE-302(A)
M.E./M.Tech., III Semester
Examination, June 2017
Stability Theory in Structural Engineering
(Elective-II)

Time : Three Hours

Maximum Marks : 70

Note : 1) Attempt any five questions.
2) All questions carry equal marks.
3) Assume missing data suitably.

1. Using higher order differential equation, determine critical load for column with one end fixed and other pinned.

2. A thin column of height L is of uniform cross-section and has lower end rigidly fixed while the upper one is free. At the free end it supports an axial load p and a horizontal force F. Find the horizontal displacement of column.

3. A column of height L is hinged at the base and elastically restrained by a beam of length L at its upper end. Flexural rigidity of column and that of beam is constant and equal to EI. Working from the first principles derives the expression for the critical load if the column is subjected to axial load P.

4. Obtain expression for the maximum moment of beam column of length L and simultaneously acted on by a laterally UDL ω and axial Force P.

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5. Derive the differential equation of thin plate buckling under the action of in-plane forces.

6. For a cantilever I-beam of span L, with web vertical and acted upon by a Torque T at the free end of the beam, derive the expression for torque T.

7. To study the convergence of budding load to its exact value consider a cantilever column subjected to an axial load is underformed equilibrium position. Using Energy approach find the critical load for two cases using one and two rigid element discretizations, respectively.

8. Write detailed notes on following :
    a) Critical load of Laced and Battened columns
    b) Matrix method in stability problems

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