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

Question Paper Code: 92064

M.E. DEGREE EXAMINATION, MAY 2017

Elective

Structural Engineering

01PSE512 – STABILITY OF STRUCTURES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List the various approaches for analyzing stability of column.
2. Write the governing differential equation for the buckling of column.
3. Quote the uses of Shanley's model.
4. Explain tangent modulus theory.
5. Define beam-column.
6. How the buckling load of a column with variable cross section is obtained?
7. Write a note on St.Venant's torsion.
8. Discriminate between local buckling and lateral buckling.
9. Draw elastic buckling of thin plates.
10. Write a note on finite difference method as applied to plate buckling.

PART - B (5 x 14 = 70 Marks)

11. (a) Obtain the critical load by imperfection approach for both ends fixed column. (14)

Or

(b) Derive the higher order governing differential equation for stability of columns. Also analyze the column with one end clamped and other hinged end boundary conditions. (14)

12. (a) Determine the critical buckling load for column with fixed - hinged boundary condition using Galerkin's method. (14)

Or

(b) Briefly discuss about the double modulus theory. Also derive the differential equation for the column buckling in the inelastic range. (14)

13. (a) A beam-column of length, l is simultaneously subjected to a transverse load *Q* and axial load *P* is shown in Fig.1. Obtain the expression for maximum deflection and maximum moment. (14)

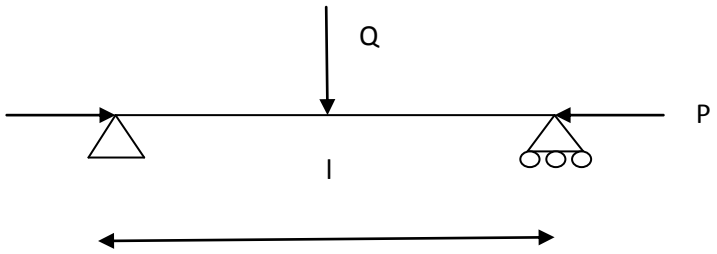

Fig 1

Or

(b) Derive an expression for simply supported plate subjected to compressive force along boundary by finite difference method. (14)

14. (a) Find the critical buckling load of a rectangular plate whose boundaries are fixed and it is subjected to uniform compressive force acting along the entire boundary. Use energy approach. (14)

Or

(b) Derive the expression for the critical lateral buckling moment for the beam subjected pure moment. (14)

15. (a) Derive the governing differential equations of equilibrium for buckling of thin plate subjected to in-plane forces. (14)

Or

(b) Determine the critical buckling load of uniaxially compressed square plate, fixed along all edges by energy method. With suitable assumptions. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) Explain in detail about Newman's method and finite difference method with examples. (10)

Or

(b) Using the Rayleigh Ritz's method, determine the critical load for column fixed at one end and free at the other end. (10)

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