Reg. No. :

Question Paper Code: 51U04

M.E. DEGREE EXAMINATION, DEC 2020

First Semester

Structural Engineering

15PSE104 - STABILITY OF STRUCTURES

(Wood chart and Stability functions table may be permitted)

(Regulation 2015)

Duration: 1.15 hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Effective Length of a fixed – hinged column is   CO1- R

   (a) 0.707 L   (b) L/2   (c) 2L   (d) L

2. Effective Length of a fixed – free column is   CO1- R

   (a) 0.707 L   (b) L/2   (c) 2L   (d) L

3. In _____ method equilibrium will be established by Law of   CO2 -R
   conservation of Energy.

   (a) Energy   (b) Rayleigh ritz   (c) Galerkin's   (d) Finite difference

4. In _____ method equilibrium will be established by Total Potential   CO2 -R
   Energy.

   (a) Energy   (b) Rayleigh ritz   (c) Galerkin's   (d) Finite difference

5. In a beam-column for constant transverse load the load deflection   CO3- R
   curve is _____

   (a) Parabolic   (b) Linear   (c) cubic parabola   (d) horizontal

6. A member subjected to axial load and bending is called as   CO3- R

   (a) Beam   (b) Column   (c) Slab   (d) Beam-Column

7. Critical load of frames in which side sway is prevented will be in the   CO4 -R
   range of

   (a) P_E (b) ¼ P_E (c) $2P_E$ (d) $4P_E$

8. Critical load of a portal frame for very low values of girder stiffness in which sidesway is prevented is   CO4 -R

   (a) P_E (b) ¼ P_E (c) $2P_E$ (d) $4P_E$

9. In Buckling Analysis of Thin Plates _____ is negligible.   CO5- R

   (a) Normal Stress   (b) Normal Strain   (c) Shear Strain   (d) All the above

10. Critical load of a plate is its _____   CO5- R

   (a) Ultimate load   (b) failure load   (c) yield load   (d) Buckling load

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Determine the buckling load of a fixed- fixed column using higher order differential equation.   CO1- App   (8)

12. Using Finite Difference method, determine the buckling load of a fixed-fixed column. Obtain solutions with the column divided into two, three and four segments and extrapolate these results using Richardson's method.   CO2- App   (8)

13. Derive the slope deflection equation for a beam – column.   CO3-App   (8)

14. Using Equilibrium approach determine the critical load of a portal frame subjected to symmetrical loading and sidesway is permitted. Take EI and L for beam and column are same.   CO4 -App   (8)

15. Using Equilibrium approach determine the critical load of a simply supported rectangular plate   CO4 - App   (8)

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