Roll No. .....

23382

M. Tech. 2nd Semester Civil Engg. (Specialisation in Structural Engg.) (Elective-II) Examination – June, 2023

STABILITY OF STRUCTURES

Paper : CE-612

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all. All questions carry equal marks.

1. Explain the lateral buckling of simply supported beam of narrow rectangular section. Write a technical note on combined Torsional and Flexural buckling. 20

2. Find the critical load of a square plate of size a **x** a whose edge are simply supported and subjected by a uniformly distributed load of w along the entire boundary using Finite difference method. 20

3. (a) Derive the expression for flexural rigidity of a thin plate subjected to pure bending. 10

(b) Explain non uniform torsion of thin walled open cross section. 10

4. Write short notes on : $5 \times 4 = 20$

(i) Creep buckling

(ii) Orthogonality relation

(iii) Pure bending

(iv) Difference between lateral and longitudinal buckling.

5. A portal frame ABCD of single bay single storey, having same length and same flexural rigidity for columns AB, CD and girder BC, is supported by hinges at A and D. The columns AB and CD are subjected to same axial load P at B and C. Determine the critical load of the frame for symmetric mode. 20

6. Discuss the following :

(a) Application of Rayleigh-Ritz method 10

(b) Application of trigonometric series 10

7. Discuss warping displacements under pure torsion. What will be the Warping constants for rolled steel section ? Explain. 20

8. Derive the expression for deflection and maximum moment of a beam column acted upon by a uniformly distributed load through- out its length. 20