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Total Number of Pages : 01

M.TECH

AR-18

M.TECH 1ST SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019
SE,MSEPC1020

ELASTIC STABILITY AND BEHAVIOUR OF METAL STRUCTURES

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

- Define plastic modulus.
- What do you mean by mechanism condition?
- Define ductility.
- Differentiate between lower bound and upper bound theorem.
- Find the shape factor of a rectangular section of width 'b' and depth 'd'.
- Define critical stress.
- State the equation for expression of curvature of the axis of beam.
- For plastic analysis of rigid frames which method is generally preferable and why?
- What do you mean by torsional buckling?
- Define stability.

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

2..

- Explain the stress distribution of rectangular beam under bending in successive stages beyond the elastic limit and up to stage of plastic limit.
- Determine an approximate value for a critical load of an axially loaded column hinged at one end and fixed at other using energy method.

3.

- Find out the critical stress and critical moment for an I beam subjected to couples at end.
- A thin walled bar of open cross section is subjected to couples at the end. Derive the expression for warping displacement.

4.

- Find out the shape factor for circular section of diameter d.
- A fixed beam of span length L is subjected to udl of w per unit run. Compute the ultimate load.

5.

- Derive an expression for the deflection curve of beam column subjected to udl of q/metre run.
- Derive the fourth order differential equation for bending of plates by distributed lateral load 'q' over the entire surface of plate.

6.

- Derive the differential equation for lateral buckling of beams.
- Also find out an expression for critical value of Moment M_0 acting at the ends for above.

7.

- Derive the expression for critical load for column fixed at one end and hinged at other end.
- State the advantages of plastic analysis over elastic analysis.

8. Write Short notes on

- Mechanism and Equilibrium method
- Slenderness ratio