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Total Number of Pages : 01

M.TECH

M.TECH 1<sup>ST</sup> SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019

THEORY OF ELASTICITY AND PLASTICITY

Branch: SE, Subject Code:MSEPC1010

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.

- Write the equation of equilibrium and compatibility for two dimensional elastic body.
- Name two theories of failure for ductile material.
- Define isotropic, orthotropic, and anisotropic material.
- Explain flow rule.
- What do you mean by pure torsion?
- Define shape factor.
- Write Hooke's law in three dimensions.
- What is stress tensor?
- Write the constitutive relationship for plane stress condition.
- State maximum strain energy theory.

**PART-B**

(5 X 10=50 MARKS)

Answer any five questions from the following.

- Discuss various theories of failure for ductile material. (5)
  - Compare the yield criteria of Tresca and Von Mises. (5)
- Derive the stress distribution in an elliptical cross section. (5)
  - Differentiate between surface force and body force with examples. (5)
- Using suitable stress function, derive the displacements for cantilever beam loaded at free end.(5)
  - Derive stresses for above beam. (5)
- Derive the compatibility equation in terms of stress for three dimensional elastic body. (5)
  - Write down four important properties of slip line field. (5)
- Derive the stress distribution in a thick cylinder by using elasticity. (5)
  - Draw three dimensional bodies showing all components of stress. (5)
- Explain Prandl stress Reuss- strain relationship.. (5)
  - Explain membrane analogy. (5)
- Write short notes on: (5x2)
  - Saint Venant Principle
  - Stress function

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