GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

BD18002008

Registration No:

Total Number of Pages : 01 **M.TECH**

M.TECH 1ST SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019
THEORY OF ELASTICITY AND PLASTICITY
Branch: SE, 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.

(a) What do you mean by pure torsion?
(b) What do you mean by compatibility condition?
(c) Write the formula for shafts of uniform cross-section.
(d) What do you mean by complimentary stress?
(e) State maximum strain energy theorem.
(f) What is the utility of polar coordinates?
(g) What is membrane analogy?
(h) Explain the yield criteria for ductile and brittle material.
(i) Differentiate between plane stress and plane strain with examples.
(j) State the assumptions of elasticity.

PART-B **(5 X 10=50 MARKS)**

Answer any five questions from the following.

2.
(a) Derive the stress function and compatibility equation in polar coordinates for two dimensional element.
(b) Derive the equation of equillibrium for three dimensional deformable body. [5]

3.
(a) Derive the equation for shear stress for an elliptical bar subjected to torsional moment M.
(b) Derive the shape factor for I section.

4.
(a) Explain Octahedral stress theory.
(b) Derive the Saint Venant torsional equation for prismatic bar subjected to pure torsion in terms of stress function.

5.
(a) Explain Boundary value problem.
(b) Describe the various theories of failure for ductile material.

6.
(a) Derive the expression for three components of stress parallel to three coordinate axes and the orientation of principal plane.
(b) Describe stress function and investigate the state of stress in a rectangular plate with slides parallel to coordinate axes.

7.
(a) Derive compatibility equation in terms of stress for a plane strain problem in absence of body force component X,Y along x and y direction.
(b) Prove that elastic strain energy is the sum of strain energy of dilation and strain energy of distortion.

8. Write Short notes on
(a) Compatibility condition for three dimensional elastic body.
(b) Boundary Value problem

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