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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)****M.Tech I Year I Semester Regular & Supplementary Examinations February 2018****THEORY OF ELASTICITY****(Structural Engineering)**

Time: 3 hours

Max. Marks:60

(Answer all Five Units 5 X 12 =60 Marks)

UNIT-I

- 1 a State Hooke's law and explain about pure shear. 6M
b Obtain the relationship between three elastic moduli for plan stress problem. 6M

OR

- 2 a Derive the equations of equilibrium in Cartesian form 6M
b Derive the differential equations of equilibrium and compatibility equations in 2-Dimensional Cartesian coordinate system. 6M

UNIT-II

- 3 a Discuss the various stress cases obtained by taking third order polynomial as Airy's stress function 6M
b Derive stress-strain displacement relations for Cartesian coordinate system. 6M

OR

- 4 Assume the fifth order polynomial degree for the rectangular beam strip and find the Airy's stress function with the different stress components. Analyze the behavior of the beam and draw the stress distribution diagram 12M

UNIT-III

- 5 a Obtain the general expression for stresses for an axisymmetric problem 6M
b Obtain the compatibility expression for two dimensional problem in polar coordinates. 6M

OR

- 6 Derive the differential equilibrium equation in polar coordinates for two dimensional elastic bodies. 12M

UNIT-IV

- 7 a Derive the expression for principal stresses in three dimensions 6M
b What is meant by Homogenous deformation? Explain with examples 6M

OR

- 8 Derive the compatibility relation of strain in a 3D elastic body. What is its significance? 12M

UNIT-V

- 9 Explain and derive the equation for the Prandtl's membrane analogy 12M

OR

- 10 write short notes on.
a) Distortion Energy.
b) Prandtl membrane analogy
c) Saint venant's principle 12M

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