QP Code: RJ23MTECH017 | Reg. No | | | | | | | | | | | AY 23

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester) Examinations, January – 2024

MPCSE1010 - Theory of Elasticity and Plasticity

(Structural Engineering)

Time: 3 Hrs | Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer all questions	CO#	Blooms Level
a. Define spherical and deviator stress tensor.	CO1	K1
b. State generalized Hooke's law.	CO1	K1
c. Explain octahedron stresses.	CO2	K2
d. State maximum strain energy theory.	CO2	K2
e. What do you mean by torsional rigidity?	CO2	K1
f. What do you mean by rigidity?	CO3	K1
g. Write the formula for shafts of uniform cross-section.	CO3	K1
h. What do you mean by complimentary stress?	CO4	K1
i. What is the utility of polar coordinates?	CO4	K1
j. Give the Green's Formula.	CO1	K1

PART – B **(10 x 5=50 Marks)**

Answer ***ANY FIVE*** questions	Marks	CO#	Blooms Level
2. a. Derive the stress distribution in a thick cylinder by using elasticity.	5	CO1	K2
b. Draw three dimensional bodies showing all components of stress.	5	CO1	K2
3.a. Derive the compatibility equation in terms of stress for three dimensional elastic body.	5	CO1	K2
b. What are the conditions of compatibility?	5	CO1	K1
4. a. State plane stress and plane strain. Discuss the plane stress and plane strain for two dimensional problems with illustrations.	5	CO2	K3
b. Find the expression for the normal and shear for a circular disc subjected to compression along the diameter.	5	CO2	K3
5.a. Using Fourier Integral method, determine the solution of biharmoic equation in Cartesian Coordinates.	5	CO2	K3
b. Describe the deflection equation for the bending of a cantilever loaded (point	5	CO2	K2

	load) at the end in terms of Cartesian coordinates.			
6. a.	Explain boundary value problem.	5	CO3	K2
b.	Derive Maxwell stress functions.	5	CO3	K2
7.a.	State the theories of failure with examples.	5	CO4	K4
b.	Derive stress function in terms of x and y in absence of body force.	5	CO4	K4
8. a.	Develop the differential equation of equilibrium in three dimension of a rectangular element.	5	CO4	K2
b.	Explain Principal stress theory.	5	CO4	K2

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