MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
M.Tech I Year I Semester (R18) Supplementary End Semester Examinations – DEC 2020
THEORY OF ELASTICITY AND PLASTICITY
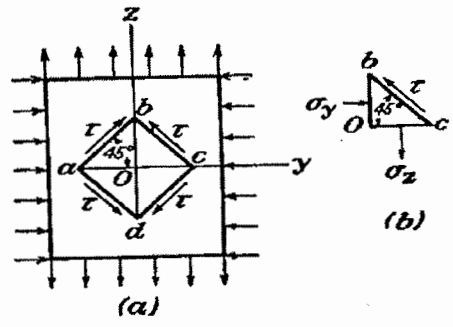### (Structural Engineering)

Time: 3Hrs   **Max Marks: 60**

> Attempt all the questions. All parts of the question must be answered in one place only.
> **In Q.no 1 to 5 answer either Part A or Part B only.**

Q.1(A)   Define Hooke's Law. Derive the relationship between shearing strain and shearing   12M
stress for the structure under the given stress condition.

OR

Q.1(B)   Determine the values of the constants $a_1, a_2, \ldots \ldots, a_6$ so that the following   12 M
state of strain is a possible one.

$$\epsilon_x = 13x^2y^2 + a_1y^3z^2$$
$$\epsilon_y = 14a_2y^3z + 12a_3x^2yz^2$$
$$\epsilon_z = 13a_4xyz^2 + 12x^3y^2$$
$$\gamma_{xy} = 12a_5x^3y + 2xy^2z^2$$
$$\gamma_{yz} = 13y^4 + 14x^2y^2z + 12a_6x^3yz$$
$$\gamma_{zx} = 12a_4yz^3 + 13a_{6x}^2y^2z - 12xy^3z$$

Q.2(A)	(i)Discuss polynomial solution for two dimensional problems.	6M
	(ii)Mention the limitations of polynomial solutions.	6M

OR

Q.2(B)	Derive the expression for the torsion of Elliptic cross section.	12M

Q.3(A)	Derive expression for Equations of equilibrium in three dimensions?	12M

OR

Q.3(B)	Compute the strain energy U stored in a bar when suspended from one end carries in addition to its own weight, an axial load P_0.	12M

Q.4(A)	Derive the expression for the torsion of Elliptic cross section.	12M

OR

Q.4(B)	The following describes the stress distribution in a body in MPa:	12M

$$\sigma_x = x^2 + 2y$$
$$\sigma_y = xy - y^2 z$$
$$\tau_{xy} = -xy^2 + 1$$
$$\tau_{yz} = 0$$
$$\tau_{xz} = xz - 2x^2 y$$
$$\sigma_z = x^2 - z^2$$

Determine the body force distribution and the resultant body force required for equilibrium and the magnitude of its resultant at
the point x = 10 mm, y = -30 mm, z = -60 mm.

Q.5(A)	Compute the values of σ_x , σ_y and τ_{xy} assuming the Airy's stress function as a polynomial of the third, fourth and fifth degree.	6M 6M
	OR	
Q.5(B)	Explain the following following theories of failure (a) Maximum Principal stress theory (Rankine) (b) Maximum shear stress theory (Guest - Tresca)	12M

END

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M.Tech I Year I Semester (R18) Supplementary End Semester Examinations – DEC 2020
RESEARCH METHODOLOGY AND IPR

Time: 3Hrs   **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only. **In Q.no 1 to 5 answer either Part A or Part B only.**

Q.1(A)	What is research? How can we find a reliable research topic and explain in brief.	12M
	OR	
Q.1(B)	Explain the approaches of investigation of solutions for research problem. List out the steps involved in a good literature.	12M

Q.2(A)	Briefly explain creating a good research proposal. What is plagiarism?	12M
	OR	
Q.2(B)	How to do an Effective technical writing?	12M

Q.3(A)	Describe the steps involved in successful technology licensing?	12M
	OR	
Q.3(B)	Discuss in brief about the trademark Law in India, its treaties and reciprocal arrangements.	12M

Q.4(A)	Elaborate the scopes of patent rights?	12M
	OR	
Q.4(B)	Discuss in brief about the Geographical Indications.	12M

Q.5(A)	How the Intellectual Property Rights develops in India?	12M
	OR	
Q.5(B)	Discuss in detail the International signatory of India on Intellectual Property Rights.	12M

END