Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2171916 Date:28/04/2018

Subject Name:Applied Mechanics of Solid(Department Elective - I)

Time:02.30 PM to 05.00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define the term "Shear Lag".	**03**
	(b)	Explain Homogeneous deformation.	**04**
	(c)	Enlist theory of failures and explain any two.	**07**
Q.2	**(a)**	Describe the significance of compatibility equations in 2D.	**03**
	(b)	Explain Yield and Failure criteria.	**04**
	(c)	Explain Mohr's circle diagram for principal strains.	**07**
		OR	
	(c)	Explain following terms: Stress Invariants, Photo-elastic stress measurement and principles of least work.	**07**
Q.3	**(a)**	Elaborate Saint Venant's Principle.	**03**
	(b)	Define: Plane stress and plane strain.	**04**
	(c)	Explain Airy stress function in Cartesian Coordinates.	**07**
		OR	
Q.3	**(a)**	What is incremental consecutive equation?	**03**
	(b)	Derive equation of Pure bending of prismatic bar.	**04**
	(c)	Prove that to convert a plane strain solution to a plane stress solution, substitute $\frac{1+2\nu}{(1+\nu)^2}E$ for E and $\frac{\nu}{1+\nu}$ for ν.	**07**
Q.4	**(a)**	Explain Hooke's law for elastic material.	**03**
	(b)	Write down comparison between Tresca and Von-Mises theory (Plane Stress).	**04**
	(c)	Derive differential equations of equilibrium for an elastic body.	**07**
		OR	
Q.4	**(a)**	Define Principle of super position with an example.	**03**
	(b)	Describe the term "Octahedral Stresses".	**04**
	(c)	Explain Druker's stability postulate for stability of work-hardening materials.	**07**
Q.5	**(a)**	What is Work Hardening of a material?	**03**
	(b)	"If the load is released after plastic deformation, residual stresses as well as residual strains will be developed." Justify the statement.	**04**
	(c)	Explain convexity, normality and uniqueness for elastic perfectly plastic materials.	**07**
		OR	
Q.5	**(a)**	Define: Deformation theory of plasticity.	**03**
	(b)	What is EPP materials?	**04**
	(c)	Explain Flow rule, effective stress and effective strain for work hardening material.	**07**

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