

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2171916

Date:10/05/2019

Subject Name:Applied Mechanics of Solid

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) Explain Homogeneous deformation.	03
	(b) Define the term “Shear Lag”.	04
	(c) Explain Mohr’s circle diagram for principal strains.	07
Q.2	(a) What is Recaptulation? Explain in brief.	03
	(b) Explain Yield and Failure criteria.	04
	(c) Enlist theory of failures and explain any two.	07
	OR	
	(c) The state of stress at a point is such that $\sigma_x = \sigma_y = \sigma_z = \tau_{xy} = \tau_{yz} = \tau_{zx} = \rho$ Determine the principal stresses and their directions.	07
Q.3	(a) Elaborate Octahedral Shearing stress theory in theory of failures.	03
	(b) Elaborate Saint Venant’s Principle	04
	(c) Derive stress distribution using Airy’s stress function in a simply supported beam subjected to pure bending.	07
	OR	
Q.3	(a) What is Circular Polariscopes?	03
	(b) State basic assumptions for the theory of incremental constitutive relation for elastic – plastic material.	04
	(c) With the help of neat sketch, discuss behavior of Prandtl-Reuss under plane stress $\sigma_{ij} = [\sigma_1, 0, \sigma_3]$.	07
Q.4	(a) Explain Hooke’s law for elastic material.	03
	(b) Derive the equation of stress of thick pressure vessels only subjected to external pressure.	04
	(c) Explain Normality, Convexity and Uniqueness for an elastic solids.	07
	OR	
Q.4	(a) Define Principle of super position with an example.	03
	(b) Explain Von mises theory.	04
	(c) Explain the Principle of virtual work and prove the relation for elastic solids.	07
Q.5	(a) State term associated flow rule benefits compared to non-associated flow rules.	03
	(b) State the term Kinematic Hardening for an elasto-plastic material.	04
	(c) Explain Flow rule, effective stress and effective strain for work hardening material.	07
	OR	
Q.5	(a) Define: Deformation theory of plasticity.	03
	(b) Explain stress strain relation for work hardening material.	04
	(c) State the term Bouschinger Effect for an elasto-plastic material.	07
