

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2171916****Date:19/01/2021****Subject Name:Applied Mechanics of Solid****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any **FOUR** questions out of **EIGHT** questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Enlist theory of failures and explain any one. **03**  
(b) Define: 1) Body forces, 2) Surface forces **04**  
(c) Explain Mohr's circle diagram for principal stresses. **07**
- Q.2** (a) Write the use of FOS in design. **03**  
(b) List out the theories of failure and explain any one of them. **04**  
(c) Derive equation of Principal stresses in 2D. **07**
- Q.3** (a) Explain Circular Polariscopes. **04**  
(b) Explain the plane stress and plane strain. **07**  
(c) Write and discuss incremental constitutive relation for elastic – plastic material. Also state basic assumptions for the theory. **07**
- Q.4** (a) Define the state of pure shear. **03**  
(b) What do you mean by the principle of virtual work. **04**  
(c) Derive stress distribution using Airy's stress function in simply supported beam subjected to pure bending. **07**
- Q.5** (a) Explain Hooke's law for elastic material. **03**  
(b) Write a short note on octahedral stresses. **04**  
(c) Explain stress strain relation in terms of plastic flow **07**
- Q.6** (a) Explain Bouschinger effect. **03**  
(b) Explain the Principle of virtual work and prove the relation for elastic solids. **04**  
(c) Explain the stress integration of Drucker - Prager material model **07**
- Q.7** (a) Describe the term Strain Hardening. **03**  
(b) State the term Bouschinger Effect for an elasto-plastic material **04**  
(c) Write a note on Drucker's stability postulate for stability of work-hardening materials. **07**
- Q.8** (a) What do you mean by principle of super position? **03**  
(b) Explain the work hardening of a material. **04**  
(c) Explain Normality, Convexity and Uniqueness for an elastic solid. **07**

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