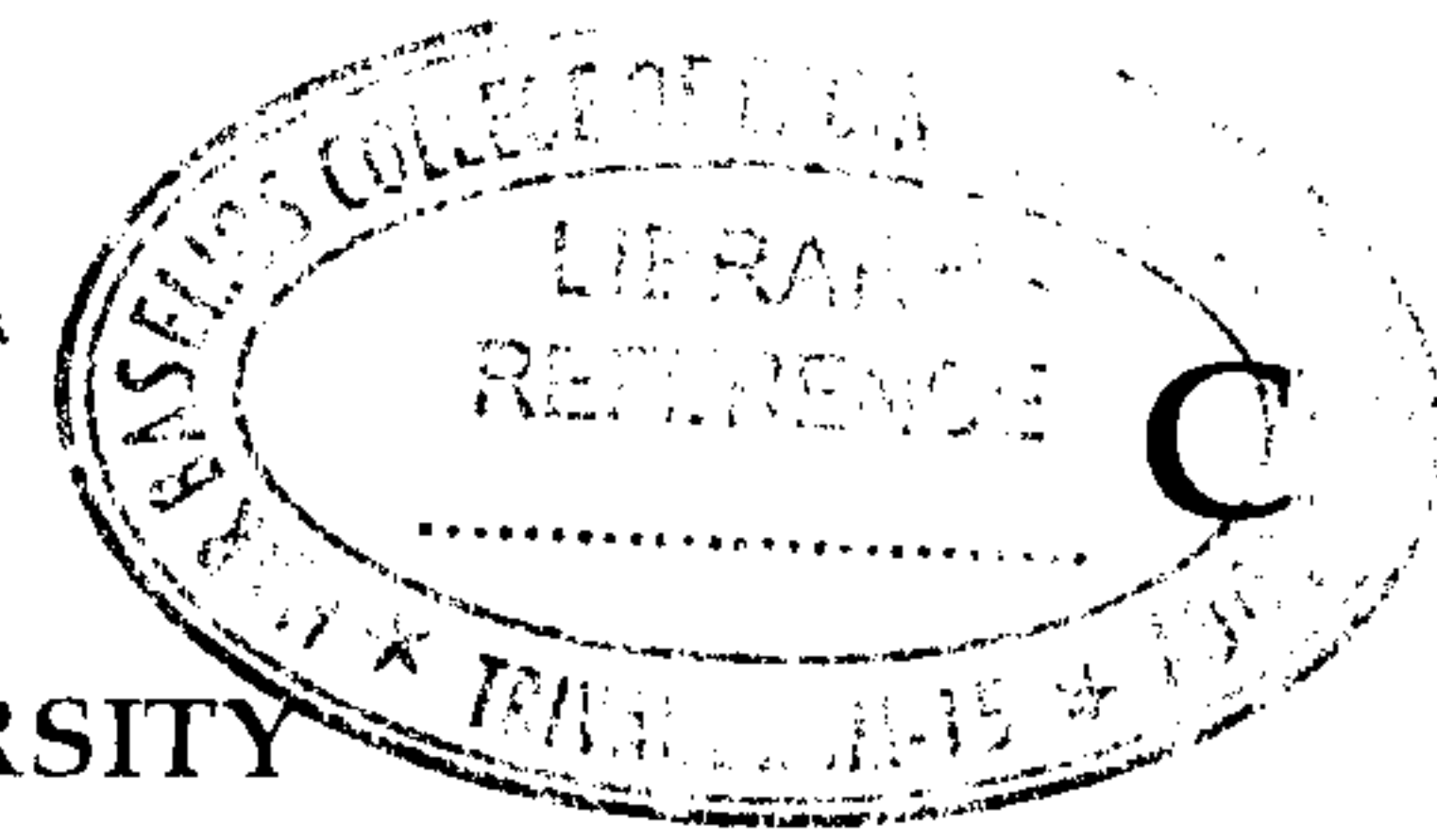


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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY  
SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY-JUNE 2019  
Mechanical Engineering

(Machine Design : Regular and Part Time)

01ME6106 EXPERIMENTAL STRESS ANALYSIS

Answer any two full questions from each part

Limit answers to the required points.

Max. Marks: 60

Duration: 3 hours

**PART A**

1. a. Derive the differential equations for equilibrium in Cartesian Coordinates (4.5)  
b. Explain the working of Electrical strain gages (4.5)
2. a. Explain the Mohr circle for three dimensional stresses (4.5)  
b. Explain any three gage characteristics (4.5)
3. a. Obtain the Saint Venant's equations for strain compatibility (4.5)  
b. Explain how Delta rosette can be applied to measure principal strain and its directions (4.5)

**PART B**

4. a. What is a Transducer? Explain the working of axial force transducer (4.5)  
b. Obtain an expression for intensity of light emerging from a plane Polariscopes with dark field set up (4.5)
5. a. Prove that constant current potentiometer circuit has more sensitivity than that of a constant voltage circuit (4.5)  
b. What are the properties required for ideal photo elastic material? (4.5)
6. a. Explain the mechanical calibration of a strain gage circuit (4.5)

- b. Define the stress optic law, obtain the relationship between principal stress and relative retardation (4.5)

**PART C**

7. a. Explain the crack detection methods in brittle coatings (6)  
b. Explain any two laser testing methods in N.D.T (6)
8. a. Explain the steps of Liquid penetrant test with neat sketches (6)  
b. Explain the variables influencing the coating behavior (6)
9. a. Explain the working principle of Radiography test (6)  
b. Explain any three types of available brittle coatings (6)