

IV B.Tech I Semester Supplementary Examinations, April/May 2005
EXPERIMENTAL STRESS ANALYSIS
(Aeronautical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) How do you classify the various types of errors? Explain.
(b) Differentiate between accuracy and precision.
2. Define extensometers. List down various types. Explain briefly mechanical and electrical extensometers along with their uses and relative merits and demerits.
3. (a) Define sensitivity and cross sensitivity.
(b) Explain with the help of circuit diagrams how static and dynamic strain is measured by potentiometer circuits? Also derive the expression for the magnitude of change in voltage (ΔE_2) for potentiometer circuits.
4. (a) Define strain indicators. Explain briefly about Manual Null-Balance and Manual Direct-Reading strain indicators.
(b) Explain the elementary concept of light with respect to
 - i. Polarisation
 - ii. Color and wave length.
5. (a) Define and explain photoelastic effect with respect to wave plates.
(b) What are the advantages and disadvantages of photoelastic methods for stress analysis.
(c) Define rosettes with one example.
6. (a) Define compensation. Explain briefly various compensation techniques.
(b) List down the desirable characteristics of two dimensional photoelastic materials.
7. Define NDT and explain the following techniques
 - (a) Acoustic emission technique.
 - (b) Ultrasonic magnetic particle inspection.
 - (c) Fluorescent penetrant technique.
8. Write short notes on following (any two)
 - (a) Grid method of strain analysis.
 - (b) Ceramic Based Brittle Counting.
 - (c) Ultrasonic C-scan.
