

Reg.No.:.....

Name :

**Fifth Semester B.Tech. Degree Examination, 2015
(2013 Scheme)**

**Branch: Aeronautical Engineering
13.505: EXPERIMENTAL STRESS ANALYSIS**

Time. 3 Hours

Max.Marks : 100

PART A

(10x2= 20Marks)

Answer all questions

1. Define sensitivity and range of measurement?
2. Define extensometer? What are the types?
3. Explain about the working principle of acoustical extensometer?
4. Define cross sensitivity?
5. What is Delta & T-Delta rosette analysis? Draw the configuration and derive.
6. Derive gauge factor?
7. What is stress optic law?
8. What is polariscope? Differentiate plane & circular polariscope.
9. Explain about acoustic emission technique?
10. Give short notes about holography.

PART-B

(4x20=80 Marks)

Answer One Question From Each Module

MODULE-I

- 11.a) With neat sketch explain about the types of mechanical strain gauges (20)

OR

12.a) What is the principle of Optical strain gauge? Explain Marten's mirror extensometer & Tuckerman optical strain gauge. (10)

b) Explain about Optical strain Gauge (10)

MODULE-II

13.a) Explain about the temperature compensation techniques in electrical strain gauges. (10)

b) List the characteristics of electrical resistance strain gauges. (10)

(OR)

14.a) What are strain rosettes? What are their uses? For a rectangular rosette on a steel specimen $\epsilon_A = -600 \times 10^{-6}$, $\epsilon_B = 300 \times 10^{-6}$, $\epsilon_C = 400 \times 10^{-6}$. Determine the principal strains, principal stresses and directions. $E_{\text{steel}} = 210 \text{ GPa}$. (10)

b) Derive an expression for the sensitivity of potentiometer circuit and how it is calibrated. (10)

MODULE-III

15.a) Explain Fringe sharpening. (10)

(b) Explain Fringe multiplication technique used in Photoelasticity. (10)

(OR)

16.a) Explain any two compensation techniques used in Photoelasticity. (10)

b) Explain any two separation techniques in detail. (10)

MODULE-IV

17. Explain (i) Ultrasonic testing (20)

(ii) Radiography

(iii) Acoustic emission technique.

(iv) Eddy current testing.

OR

18. Explain (i) Brittle coating Methods (20)

(ii) Moiré techniques.