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Question Paper Code : 71337

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Aeronautical Engineering

AE 6702 — EXPERIMENTAL STRESS ANALYSIS

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define range of an instrument.
2. List the factors affecting accuracy.
3. State the working principle of an acoustical strain gauge.
4. List the different types of electrical strain gauges.
5. Define material sensitivity factor of a wire material.
6. Explain the uses of strain rosette.
7. Explain optical birefringence.
8. What is a wave plate? Explain.
9. What is threshold strain of a brittle lacquer?
10. What is holography? Explain briefly.

PART B — ($5 \times 16 = 80$ marks)

11. (a) Briefly explain the ideal requirement of a measuring device.

Or

- (b) What is gauge length? Explain its importance in general field where strain is varying in the axial direction of gauge.

12. (a) With a neat sketch explain the working of Huggan Berger extensometer.

Or

- (b) Briefly explain the advantage and disadvantages of mechanical strain gauges.
13. (a) In a rectangular rosette $\epsilon_a = 1000 \mu$; $\epsilon_b = 800 \mu$ and $\epsilon_c = 650 \mu$; Calculate the principal stress if $\nu = 0.3$ and $E = 70 \text{ Gpa}$.

Or

- (b) A delta rosette yields the following strain indications.
 $\epsilon_a = -845 \times 10^{-6}$ $\epsilon_b = 1220 \times 10^{-6}$ $\epsilon_c = 710 \times 10^{-6}$. Calculate the maximum principal strain direction, principal stresses and maximum shear stress $E = 200 \text{ Gpa}$, $\mu = 0.285$.
14. (a) Derive expressions for the fringe order in a stressed model kept in the bright field combination of combination of a circular polariscope.

Or

- (b) Explain clearly the shear difference method of separating the principal stresses.
15. (a) Clearly explain Crack detection and crack multiplication techniques in brittle lacquer coats.

Or

- (b) (i) Explain briefly the used non-destructive techniques used in experimental analysis. (6)
(ii) Discuss in details any two of non-destructive techniques used. (10)