Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 80029

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

•Aeronautical Engineering

AE 6702 – EXPERIMENTAL STRESS ANALYSIS

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by stress analysis?
2. What is the difference between accuracy and precision of an instrument?
3. What is the need for rosette analysis?
4. What is sensitivity electrical resistance strain gauge?
5. Define plane polariscope and circular polariscope.
6. For what arrangements bright and dark field obtained?
7. What is the need of brittle coating?
8. Mention some of the advantages of moire techniques
9. List down various non-destructive techniques used to detect damages or flaws.
10. Briefly explain fiber optic sensors.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail with neat sketches the working of mechanical extensometers.

Or

(b) Explain in detail with neat sketches the working of optical extensometers.

12. (a) Compute the principal stresses using the following strain measurement from rectangular rosette. E = 200 Gpa and $\upsilon = 0.25$.

$$\epsilon_A = 1800 \times 10^{-6}, \epsilon_B = 600 \times 10^{-6}, \epsilon_C = -400 \times 10^{-6}$$

Or

(b) Derive the expression for the output voltage measured from a wheat stone bridge circuit.

13. (a) Write short notes on:

(i) Circularly polarized light. (5)

(ii) The stress ellipsoid (6)

(iii) Temporary double refraction. (5)

Or

(b) Write short notes on:

(i) Compensating gauge

(ii) Self - Temperature compensated (STC) strain gauges.

14. (a) Discuss briefly about the brittle coating methods and its applications.

Or

(b) Derive expression for the cross-sensitivity (transverse sensitivity) factor of an electrical resistance strain gauge with semi-circular bends.

15. (a) State the uses and advantages of non-destructive testing procedures. Explain in detail anyone NDT procedure of evaluating a given specimen.

Or

(b) Write short notes on:

(i) Thermograph (8)

(ii) Acoustic emission technique. (8)
