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Question Paper Code : 71032

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Sixth Semester

Aeronautical Engineering

AE 2352/AE 54/AE 1353/080180031/10122 AE 603 —
EXPERIMENTAL STRESS ANALYSIS

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define strain sensitivity of a gauge.
2. Name the most popular optical gauges.
3. What are the different types of electrical strain gauges?
4. What is the necessity of temperature compensation?
5. Differentiate between ordinary and monochromatic light.
6. State the stress optic law in two dimensions.
7. What is the apparent stress?
8. What do you understand by threshold strain?
9. Write the limitations of magnetic particle testing.
10. State the advantages of NDT over destructive testing.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the construction and working of the Sharpe interferometer in detail. (16)

Or

- (b) Explain the construction and working of any one optical strain gauge in detail. How do you define the magnification of an optical gauge? (16)

12. (a) Describe in detail the principle of working, uses and limitations of a linear variable differential transformer. (16)

Or

- (b) Explain the different experimental methods for determining transverse sensitivity of a gauge. (16)

13. (a) Describe the concepts of photo elastic photography. How fractional fringe order can be determined by the photographic method? (16)

Or

- (b) Describe the different methods for constructing stress trajectories from isoclinics. (16)

14. (a) Discuss the crack patterns which can be obtained under various combinations of stresses. Illustrate your answer by giving sketches. (16)

Or

- (b) Describe the calibration method generally used for brittle coatings. How true threshold strains can be determined by this method? (16)

15. (a) Explain in detail on:

(i) Thermograph. (8)

(ii) Acoustic emission technique. (8)

Or

- (b) Explain the following methods.

(i) Ultrasonic testing. (8)

(ii) Magnetic particle inspections. (8)