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Question Paper Code : 73036

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

Sixth Semester

Aeronautical Engineering

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

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the types of strain gauge.
2. Write all the strain displacement relations.
3. List the important advantages of a scratch gauge.
4. What is the use of Huggen Berger type of strain gauge?
5. A given plane polarizing sheet has its polarizing axis set in the vertical direction. The intensity of light leaving this sheet is 'I₀'. Using a second polarizing sheet, how the light intensity can be reduced to half.
6. What are the different methods of producing plane polarized light?
7. Distinguish plane polariscope and circular polariscope.
8. Define fringe order.
9. List various types of NDT.
10. What is the principal of acoustic emission technique?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the working principle of any two extensometers in detail.
Or
(b) Draw the block diagram for a generalised measurement system and explain the various steps.

12. (a) What are the basic characteristics of a strain gauge? Which factors should be considered while selecting a strain gauge?

Or

- (b) Write a short account of the various types of strain gauges. Give their special advantages and limitations.
13. (a) (i) In a calibration test fourth order fringe appeared at the bottom and top surfaces of a beam model 5 mm thick, 10 mm deep under a pure moment of 1000 Ncm. Calculate the stress fringe constant and the model constant. (7)
- (ii) Explain the inclined incidence method of separating the principal stresses. (9)

Or

- (b) Derive expressions for the fringe order in a stressed model kept in the bright field combination of a circular polariscope.
14. (a) Describe the holographic interferometry method for experimental stress analysis.

Or

- (b) Explain the methodology of strain analysis through MOIRE fringes.
15. (a) (i) Compare the advantages and limitations/disadvantages of the different methods of non-destructive testing. (10)
- (ii) Explain the dye penetrant method of non-destructive testing. (6)

Or

- (b) Explain the role of either radiography or acoustic emission testing during aircraft inspection.
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