

EXPERIMENTAL STRESS ANALYSIS

2MARKS QUESTIONS & ANSWERS

1. Define Measurement:

The measurement of a given quantity is essentially an act or result of comparison between a quantity whose magnitude (amount) is unknown, with a similar quantity whose magnitude (amount) is known, the later quantity being called a standard.

2. Give the Type of errors in measurements

(i) Gross errors (ii) Random errors (iii) systematic errors

- Instrumental errors
- Environmental errors
- Observational errors

3. What is extensometer?

Extensometer is an instrument used to measure minute deformation of material while it is subjected to a stress.

4. What are the Basic Requirements of extensometer?

1. Very high magnification: The magnification required is usually greater than 1000: 1
2. Sensitivity: The relation between input and output should not be affected by the reversal in the direction of input and this requires that the movement should not have any friction.
3. Low input force: The input force required to cause displacement should be extremely small thus there is no defamation of the component due to the process of measurement.

5. Give the magnification capacity & gauge length of Huggen-Berger extensometer

The magnification may vary from 300 to 2000 depending upon the model. The gauge length varies from 12.5 to 25 mm.

6. Give the classifications of Electrical strain gauges

- (a) inductance (or) magnetic strain gauges
- (b) Electrical resistance strain gauges

7. How strain can be measured by using Electrical strain gauges?

Electrical strain gauge is a device in which a change in length produces a change in some electrical characteristics of the gauges. (c) The capacitance strain gauges.

8. Give the working principle of eddy- current gauges

In this types of gauges the losses in the magnetic circuit are varied by changing the thickness or position of the high- loss element inserted in the magnetic field.

9. What are the methods are available for computing the strain rosette data's?

1. Analytical Solutions
2. Graphical Solutions
3. Semi \pm graphical (or) vectorial layout method
4. Nomographic Solutions
5. Geometrical Computers.

10. Define monochromatic light:

Light of a single wave length is called monochromatic light. Example: sodium vapor lamp, Hg arc lamp.

11. What is polarized light?

The light having vibration only along a single straight line perpendicular to the direction of propagation of light is said to be polarized.

12. What is the basic principle for photo elasticity?

When polarized light enters a loaded transparent component, it is split into two beams both beams travel along the same path, but each vibrates along a principal direction and travels at a speed proportional to the associated principal stress.

13. Give the most commonly used methods for compensation techniques

1. Babinet compensation method.
2. Babinet soleil compensation method
3. Tension or compression stop method.
4. Tardy method of compensation.

14. Give some advantages of Brittle coating method.

- Provides nearly whole field area.
- Is non-destructive if the coating is sensitive enough.
- Is simple to analyze

15. Define Non - destructive testing

Non-destructive testing is a technique for revealing flaws and defects in a material or device without damaging as destroying the test sample.

16. What do you mean by Polariscope?

Polariscope is an optical instrument that utilizes the properties of polarized light in its operation. Give the types of polariscopes used in experimental stress analysis? (i) Plane Polariscope (ii) Circular Polariscope.

16 MARKS QUESTIONS

1. Explain the different type of optical extensometer with its advantages and disadvantages.
2. Explain the temperature compensation methods used for strain gauges and explain the function of Self-Temperature-Compensated strain gauge.
3. Explain the Tardy's Method of compensation with neat sketches.
4. Sketch the arrangement of plane polariscope and explain the function of each component.
5. Explain Moire Techniques with neat sketch.
6. Explain in detail the working principle and measurement of strains from an Acoustical strain gauge with neat sketch.
7. Explain with necessary equations how isoclinics are eliminated in circular polariscope setup. What are the properties of isochromatics?
8. Explain: Ultrasonic testing in NDT and their applications & Radiography.