

AE8605 EXPERIMENTAL STRESS ANALYSIS

IMPORTANT QUESTIONS AND QUESTION BANK

UNIT-1

2-Marks

1. Define Measurement?
2. What are the basic requirements for measurement?
3. What are the methods of measurements?
4. What is dimensional measurement?
5. What are the 'STANDARD'S for the measurement of an angle?
6. How we can measure the Area of survey plats?
7. Give any two methods for measure an unknown force?
8. How we can measure the temperature changes?
9. Tell some thing about 'static characteristics' and 'static calibration' in measurements?
10. What is accuracy and tell about point accuracy?

Part-B

1. Explain the basic generalized measuring system with neat sketch?
2. Describe the direct reading and null balance methods in strain measurement?
3. Explain the measurement of pressure with diagram/
4. Explain the various elements of a measurement system with a block diagram?
5. Briefly explain static characteristic of measurement?
6. Explain briefly Errors in measurement?
7. Briefly Explain Un-Bonded and Bonded Electrical strain gauges?
8. Explain briefly Optical Extensometers?
9. Briefly explain the working principle of LVDT?
10. Explain with neat sketches the working of a Mechanical extensometer?
11. Explain with neat sketches the working of a Electrical extensometer?
12. What are the different types of strain gauges? What are the advantages over other types of gauges? Why foil type gauges are prepared over wire type of gauges?
13. What are the basic characteristics of a strain gauge? Which factors should be considered while selecting a strain gauge?
14. Explain about Active and passive instruments?

15. Discuss the details about in Null type and deflection type instruments?

UNIT-2

2-Marks

1. What is photo-etching?
2. What is known as strip gauges?
3. What is known as strain rosettes?
4. Give the quantities required for a good gauge material?
5. Give some arrangements of strain gauges to obtain strain rosettes?
6. What are the methods are available for computing the strain rosette datas?
7. Give the advantages of strain Rosette analysis?
8. Give the type of strain gauge circuit?
9. Define sensitivity of potentiometer?
10. Define vectorial layout method?

Part-B

1. Derive the expression for balanced and un-balanced Wheatstone bridge circuit?
2. Derive the expression for principal strains and its direction in terms of strain measured in a three element rectangular rosette (gauge A along x- axis, gauge B along 45° to the x- axis and gauge C along y- axis)?
3. Derive an expression for output voltage of Wheatstone bridge circuit for strain measurements?
4. Derive an expression for output voltage of Potentiometer circuit for strain gauges?
5. Determine principal stresses and principal strains with help of a delta rosette mounted on an aluminum specimen with values of $\epsilon_A = 400\mu$, $\epsilon_B = 400\mu$, $\epsilon_C = 400\mu$, $E_{al} = 70\text{GPa}$, $\nu = 0.3$?
6. Three strain gauges are applied to an area at a point in such a manner that gauge 'b' makes a positive angle of 30° with gauge 'a' and gauge 'c' makes a positive angle of 45° with gauge 'b'. The strain readings obtained from the gauges are as follows. Gauge Strain $\mu\text{m/m}$ a -600 b 300 c 400 Calculate the principal strains, principal stresses and principal directions.
7. Derive the expression for principal strains and its direction in terms of strain measured in a Four element rectangular rosette?
8. Derive the expression for principal strains and its direction in terms of strain measured in a Delta rosette?

9. Explain briefly the NULL balance bridges?

10. Explain the balanced and un-balanced Wheatstone circuit?

UNIT-3

2-Marks

1. Define Light?
2. Define White light?
3. Define monochromatic light?
4. What is wave front?
5. Define Ray?
6. What are longitudinal waves?
7. What are transverse waves?
8. What is polarized light?
9. What is plane of polarization?
10. What are the methods available to obtain plane polarized light?

Part-B

1. Explain the effects of stressed model in a plane polariscope in dark-field set up?
2. What is meant by compensation in photo elasticity and explain any two fringe compensation method in detail with its advantages over other methods?
3. Explain the importance of isoclinic's and isochromatic with neat sketch?
4. . Explain the separation technique based on the equilibrium equation?
5. Explain two separation technique used in photoelasticity?
6. Explain fringe sharpening and fringe multiplication techniques used in photo elasticity?
7. Derive the expression for the intensity of emerging light from a plane polariscope with a stressed model and show how it enables us to determine the isoclinics and the isochromatics?
8. Show the intensity of light emerging from circular polariscope is a function of principal stress difference?
9. Derive the relation between the stresses, relative retardation, material fringe value and thickness of photoelastic model?
10. Explain the method of isoclinic's and isochromatic?

UNIT-4

2-Marks

1. Define Non - destructive testing?
2. Give some advantages of NDT?
3. Give the advantages of Radiographic inspection?
4. Give some advantages of Brittle coating method?
5. Give some advantages by using fiber optic sensors?
6. Give the limitations of NDT?
7. Define fiber optic sensors?
8. Define Brittle coating method?
9. What is Radiographic inspection?
10. Why is the High sensitivity of fiber optic sensor?

Part-B

1. Explain the moiré method in brief?
2. discuss the fundamental properties of the moiré fringes?
3. Explain briefly the Moiré method of strain analysis?
4. Explain Brittle coating technique with neat sketch?
5. Explain working principle of Holography?
6. Explain the advantages and disadvantages of holography?
7. Enumerate the brittle coating crack pattern with explanation?
8. Write a short note on Brittle coating technique?
9. Discuss the applications of Moiré method of strain analysis?
10. Derive the relation between the strain properties of the moiré fringes?

UNIT V

2-Marks

1. Define radiography?
2. Define ultrasonic systems?
3. What is ultrasonic components?
4. Explain in short wave form?
5. Define strain analysis?
6. Define ultrasonic C scan?
7. Define holography?
8. Define fibreoptic sensor?
9. Define brittle coating technique?
10. What is the eddy current testing?

Part-B

1. Explain and application of the following radiography?
2. Explain and application of the following a ultrasonic testing?
3. Explain Moiré method of strain analysis?
4. Explain Acoustic emission technique?
5. Explain Eddy current testing?
6. Explain Brittle coating technique?
7. Explain the working principle of Fibre optic sensors with neat sketch?
8. Explain holography and ultrasonic C-scan non-destructive testing methods with its application?
9. Explain acoustic emission technique with neat sketch?
10. Explain radiography and fluorescent penetrant?
11. What is the principles of radiography and explain the production of X-rays with the help of schematic diagram?
12. What is the working of radiography?

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