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JAYA GROUP OF INSTITUTIONS-THIRUNINRAVUR
6th SEM – B.E. / B.Tech
INTERNAL ASSESSMENT-1(MODEL EXAM-1)

Sub. Name: Experimental stress Analysis.
Sub. Code: AE2352
Duration: 180 minutes

Date: 28-01-2015
Branch: Aeronautical
Max.Marks: 100

PART-A (10 x 2 =20)

1. What are the basic characteristics of a strain gauge?
2. Which factors should be considered while selecting a strain gauge?
3. Define Accuracy and Measurement.
4. Classify the strain gauges.
5. Name the types of extensometers.
6. What is a strain rosette?
7. What is a piezo electric strain gauge?
8. Explain the principle of optical strain gauge.
9. Define gauge factor.
10. Define Reliability and Linearity

PART-B (5x16=80)

- 11 a) i) Explain the basic generalized measuring system with neat sketch.
ii) Describe the direct reading and null balance methods in strain measurement.
(Or)
b) i) What are the different types of mechanical strain gauge? Explain the working of Huggenberger tensometer and inductance strain gauge with a sketch.
- 12 a) Explain the working of optical strain gauge with a sketch
(Or)
b) Explain Strain rosettes with an example for each. Explain capacitance strain gauge with a neat sketch.
- 13 a) Explain the types electrical resistance strain gauges.
(Or)
b) What is the necessity of temperature compensation? how it can be achieved?
14. (a) A delta rosette yields the following strain indications $\epsilon_a = -845 \mu\text{m/m}$, $\epsilon_b = 1220 \mu\text{m/m}$ and $\epsilon_c = 710 \mu\text{m/m}$. Calculate the maximum principal strain direction, the principal stresses and the maximum shear stress.
(Or)
b). 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 gauges are as follows $\epsilon_a = -600 \mu\text{m/m}$, $\epsilon_b = 300 \mu\text{m/m}$, $\epsilon_c = 400 \mu\text{m/m}$. Calculate the principal strain, principal stress and principal directions take $E = 210 \text{ GPa}$ and $\nu = 0.30$.
- 15 a) i) What are the basic characteristics of a strain gauge? which factors should be considered? (8)
ii) Explain with neat sketches the working of an acoustical extensometer.
(Or)
b) What are the different types of strain gauges? What are the advantages over other types of gauges? Briefly explain the working principle of LVDT