KUMARAGURU
college of technology
character is life

Register Number: …….

B.E DEGREE EXAMINATIONS: APRIL/ MAY 2016

(Regulation 2013)

Sixth Semester

AERONAUTICAL ENGINEERING

U13AEE802**:** Experimental Stress Analysis

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Accuracy can be defined as
   a) Sensitivity b) Repeatability
   c) Readability d) Linearity
2. One of the problem of repeatability of an instrument is mainly due to the existence of _____.
3. A strain gauge is a device which undergoes change in electrical _____ to measure strain.
   a) Resistance b) Conductivity
   c) Wave length d) Sign convention
4. Hugenberger extensometer exhibits gauge length of_____mm.
5. The temperature range about which the organic plastics type bonding cements oxidize and softens rapidly is _____degree centigrade.
   a) 100-400 b) 200-500
   c) 300-700 d) 400-800
6. Potentiometer circuit is sometimes called as _____
7. Pick the odd one out based on photo-elastic materials.
   a) Celluloid b) Glass
   c) Gelatine d) Kevlar
8. Stress difference inversely varies with_____
9. Eddy current testing is used to detect
   a) Surface roughness b) Voids
   c) Corrosion d) All the above
10. The wavelength of visible light is_____

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. What is meant by Gauge factor?
12. State the difference between precision and accuracy.
13. Based on Principle of operation classify the extensometers.
14. List the various limitations of a mechanical strain gauge.
15. Name the materials used for material gauges.
16. Define a strain rosette.
17. Why Tardy method of compensation is preferred over all other methods?
18. What is a stress trajectory?
19. State the importance of NDT methods in Aviation Industry.
20. What is the principle of acoustic emission technique method?

PART C (5 x 14 = 70 Marks)
(Answer not more than 400 words)

Q.No. 21 is Compulsory

21. Explain in detail about the Principles of Measurements.

22. (a) List out the various types of Mechanical strain gauges and explain Huggenberger extensometer in detail.

(OR)

(b) What are the different types of electrical strain gauges? Describe LVDT and give its uses and limitations.

23. (a) The strain measurements at a point with an equiangular rosette gave the following readings: ε_a=500 µm/m, ε_b=380 µm/m, ε_c=200 µm/m. Determine the principal strains, principal stresses and maximum shear stress at the point. E=210GPa, υ=0.286.

(OR)

(b) Derive an expression for change in output voltage of Wheatstone bridge circuit in terms of the change in resistances

24. (a) Sketch a circular polariscope. Explain the effects of a stressed model loaded in a dark field setup.

(OR)

(b) Explain any two compensation techniques used in photo elasticity.

25. (a) Write short notes on the following:
    (i) Eddy Current Testing (7)
    (ii) Radiography (7)

(OR)

(b) (i) Explain the method and importance of Fiber-optic sensors in NDT. (7)
    (ii) Explain in detail about the Acoustic Emission Technique. (7)

****