

JAYA GROUP OF INSTITUTION-THIRUNINRAVUR  
6<sup>th</sup> SEM – B.E. / B.Tech  
INTERNAL ASSESSMENT-III(MODEL EXAM-III)

Sub. Name: Experimental Stress Analysis  
Sub. Code: AE 2352  
Duration: 180 minutes

Date: 7/4/15  
Branch: Aeronautical  
Max.Marks: 100

**PART-A (10 x 2 = 20)**

1. Differentiate between precision and accuracy .
2. Give any four basic characteristics of measuring devices .
3. Define gauge resistance .
4. Define cross sensitivity.
5. State stress-optic law.
6. Define circuit sensitivity.
- 7 What is the necessity of calibration of photo elastic materials .
8. What is threshold strain of a brittle lacquer?
9. What is holography ? Explain briefly.
10. What is the principle of acoustic emission technique?.

**PART-B (5 x 16 = 80)**

11.a) Explain the basic generalized measuring system with a neat sketch (16)  
(OR)

b)i) Discuss the parameters of a parallel plate capacitance that may be varied to bring about a change in capacitance ? (8)

ii) Explain how huggenberger tensometer is used as mechanical transducer (8)

12.a) What do you understand by temperature compensation in connection with the electrical resistance strain gauges? Explain the different types. (16)

(OR)

b) A rectangular rosette was used to determine the stress situation in the experiment and following observations were recorded  $\epsilon_a = 900 \mu\text{m/m}$ ,  $\epsilon_b = 300 \mu\text{m/m}$ ,  $\epsilon_c = -200 \mu\text{m/m}$ . Determine the principal strains, principle stresses and location of principal plane. Assume elastic constant for steel  $E = 200 \text{ GPa}$  and Poisson's ratio  $\nu = 0.3$  (16)

13.a) Draw circular polariscope setup and explain how the difference of principle stresses and principal stress directions are determined. (16)

(OR)

b) i) Explain the method of calibration of photoelastic material to find fringe value? (10)

ii) Discuss the characteristics of any three photoelastic materials (6)

14.a) Discuss the moiré technique and its types in detail. Discuss photoelastic materials (16)

(OR)

b) Explain brittle coating methods in brief? What are the advantages and disadvantages. Derive an expression for coating stress (16)

15.a) Write short notes on following:

i) Radiographic test (4)

ii) Ultrasonic test. (4)

iii) Magnetic particle inspection method (4)

(OR)

b) Write short notes on following:

i) Eddy current testing (4)

ii) Acoustic emission technique (4)

iii) Dye penetrant method (4)