

Roll No.

22223

M. Tech. 1st Sem. (Machine Design)

Examination–January, 2013

Experimental Stress Analysis

Paper-M-805-A

Time : 3 hours

Max. Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

Note : Attempt any **five** questions. All questions carry equal marks.

1. Explain with neat sketch, the null mode of wheat stone bridge circuit used for strain measurement 20

2. (a) Explain stress optic law and strain optic law. 4

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(1)

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(b) Explain the working principle of Martens optical strain gauge and scratch strain gauge. 20

3. (a) Define : 10

(i) Accuracy & Sensitivity with examples.

(ii) Precision of an instrument.

(iii) Working principle of acoustical extensometer.

(iv) Fringe sharpening.

(v) Need of Rosette Analysis.

(b) Explain the principle of operation of LVDT with a neat sketch. Also discuss its performance characteristics. 10

4. Explain Fringe sharpening & Fringe multiplication techniques used in photo elasticity. 20

5. What is extensometer ? List the types of extensometers. Explain with neat sketch the working of extensometer in each type. 20
6. Determine the principle stresses and principal strains with the help of a delta rosette mounted on an Aluminum specimen with values of $\epsilon_A = 400\mu$, $\epsilon_B = 200\mu$, $\epsilon_C = 100\mu$, $E_{al} = 70 \text{ GPa}$, $r = 0.3$. 20
7. Define an expression for output voltage of wheatstone bridge circuit for strain measurement. 20
8. (a) What is brittle coating ? Explain the types of brittle coating. 10
- (b) Explain delta strain gauge rosette and photo elastic strain gauge. 10