



Seventh Semester B.E. Degree Examination, June/July 2019
Experimental Stress Analysis

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Enumerate desirable characteristics of an adhesive, explain strain gauge mounting technique. (10 Marks)
b. Define gauge factor and derive an expression for gauge factor. (10 Marks)
- 2 a. Define strain Rosette. With sketch give different types of strain Rosette configuration. (06 Marks)
b. Three strain gauges are applied to an area at a point in each a manner '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 Take $E = 210\text{GPa}$ and $\mu = 0.30$. (14 Marks)

- 3 a. Briefly discuss the effect of stressed model in a circular polariscope with dark field arrangement. (10 Marks)
b. Briefly discuss calibrations of photo elastic material. Explain calibration of photo-elastic material using circular disc. (10 Marks)
- 4 a. Explain the shear difference method for the separation of principal stresses. (10 Marks)
b. List properties and explain any five properties of photo-elastic material. (10 Marks)

PART - B

- 5 a. Explain stress freezing method with neat sketch. (10 Marks)
b. With a neat sketch explain scattered light polariscope. (10 Marks)
- 6 a. Explain birefringence. Explain how stresses and strain can be measured using birefringent coating. (08 Marks)
b. How principal stresses of a coated specimen are separated by oblique incidence method? Explain in detail. (12 Marks)

- 7 a. Brief brittle coating technique. How it is useful for stress analysis? (04 Marks)
b. Discuss the crack patterns which can be obtained in a brittle coating under various combinations of stresses. Illustrate your answer by sketches. (08 Marks)
c. Describe the calibration method generally used for brittle coating. How true threshold strains can be determined by this method. (08 Marks)
- 8 Write short notes on any four:
a. Isoclinic and Isochromatic fringes
b. Tardy's method of compensation
c. Moiré's fringes
d. Whetstone's Bridge
e. Advantage and Application of Brittle coatings. (20 Marks)

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