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10ME761

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Experimental Stress Analysis

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Explain with a neat sketches, working of Weldable Strain Gauges. **(10 Marks)**

b. Explain with sketches, the principle of working of the following strain gauge circuits :
i) Potentiometer ii) Wheat stone bridge. **(10 Marks)**

2 a. What do you understand by Strain Gauge Rosette? With the help of neat sketches, give types of Strain Rosette Configuration. **(06 Marks)**

b. A rectangular strain gauge rosette is bonded at a critical point onto the surface of a structural member when the structural member loaded, the Strain gauges, show the following reading :

$\varepsilon_0 = 850\ \mu m/m$	$\varepsilon_{45} = -50\ \mu m/m$
$\varepsilon_{90} = -850\ \mu m/m$	$\mu = 0.285$

The gauge factor and the cross sensitivity of the gauges are 2.80 and 0.06, find
i) Actual strains.
ii) Magnitude and directions of connected principal strains. **(14 Marks)**

3 a. Explain what do you mean by Calibration method. List the Calibration methods and explain anyone method in detail. **(10 Marks)**

b. Explain with a neat sketch, the arrangement of plane polariscope and hence explain isochromatics and isoclinics. **(10 Marks)**

4 a. Explain the Shear difference method for the separation of principle stress. **(10 Marks)**

b. What are the properties of an ideal photoelastic materials? Discuss a few important photoelastic materials. **(10 Marks)**

PART - B

5 a. Explain the Stress freezing technique for three dimensional photoelasticity. **(10 Marks)**

b. Explain with a neat sketch, the phenomenon of scattered light photoelasticity. **(10 Marks)**

6 a. Explain with a neat sketch, the principle of operation of a reflection polariscope. **(08 Marks)**

b. Explain how Stresses and Strains can be measured using a birefringent coating. List the various Assumptions. **(12 Marks)**

7 a. What is Brittle Coating? How it is useful for Stress Analysis. **(06 Marks)**

b. Explain with neat sketches, Brittle coaling crack patterns produced by different states of stress. **(10 Marks)**

c. Explain calibration of Brittle coatings. **(04 Marks)**

8 a. Explain the geometrical approach for Moiré Fringe analysis. **(10 Marks)**

b. Explain the method of out of plane displacement measurement using Moiré technique. **(06 Marks)**

c. List the applications and advantages of Moiré technique. **(04 Marks)**

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