



USN

--	--	--	--	--	--	--	--	--	--

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 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 :

$\epsilon_0 = 850 \mu\text{m/m}$	$\epsilon_{45} = -50 \mu\text{m/m}$
$\epsilon_{90} = -850 \mu\text{m/m}$	$\mu = 0.285$

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 coating 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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.