

CBCS SCHEME

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15ME832

Eighth Semester B.E. Degree Examination, July/August 2021 Experimental Stress Analysis

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. With a schematic diagram, explain generalized measurement system. (08 Marks)
b. List and explain performance characteristics of Electrical resistance strain gauge. (08 Marks)
- 2 a. Define gauge factor and derive an gauge factor for an electrical resistance strain gauge. (08 Marks)
b. Derive an equation for sensitivity of wheat stone bridge circuit. (08 Marks)
- 3 a. Define strain rosette and sketch the different configurations of the strain rosette. (08 Marks)
b. A delta rosette yields the following strain indications $\epsilon_a = -845 \mu\text{cm/cm}$, $\epsilon_b = 1220 \mu\text{cm/cm}$, $\epsilon_c = 710 \mu\text{cm/cm}$. Calculate principal stresses and strains. And its directions and maximum shear stress. Take $\gamma = 0.285$, $E = 2 \times 10^6 \text{ kg/cm}^2$. (08 Marks)
- 4 a. Explain with a neat sketch of Analytical mass balance system. (08 Marks)
b. Write a short note on: i) Proving ring ii) Prony brake Dynamometer. (08 Marks)
- 5 a. State stress optic law and derive stress optic law for 2D photoelasticity. (08 Marks)
b. With a neat sketch, explain circular polariscope under dark field set up. (08 Marks)
- 6 a. Explain the shear difference method for stress separation technique. (08 Marks)
b. Explain briefly the properties of 2D photo elastic model material. (08 Marks)
- 7 a. With a neat sketch, explain stress freezing technique for 3D photoelasticity. (08 Marks)
b. Explain scattered light polariscope. (08 Marks)
- 8 a. Define birefringence. Explain how stresses and strains can be measure using birefringent coating. (08 Marks)
b. Derive an equation for birefringent coating stresses. (08 Marks)
- 9 a. What is brittle coating technique? With neat sketches discuss the crack patterns which be obtained in brittle coating under various combinations of stresses. (08 Marks)
b. Explain the different crack detection methods used in brittle coating method. (08 Marks)
- 10 a. Describe the geometrical approach for Moire Fringe analysis. (08 Marks)
b. Explain the Moire Fringes produced by mechanical interference. (08 Marks)

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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.