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15ME832

Model Question Paper
Eight Semester B.E. Degree (CBCS)
Experimental Stress Analysis

Time:3hrs.

Max. Marks:80

Note: 1. Answer any FIVE full questions, choosing one full question from each module.

MODULE – I

- 1 a. Explain the working of generalized measurement system with block diagram taking the example. (08 Marks)
- b. Explain the following (08 Marks)
- (i) System Response (ii) Types of Experimental errors

OR

- 2 a. Derive an expression for gauge factor of an electric resistance strain gauge (08 Marks)
- b. Explain with a neat sketch (08 Marks)
- (i) Bonded wire strain gauge (ii) Weldable strain gauge

MODULE – II

- 3 a. Define a strain rosette and mention the different types of strain rosette configuration (08 Marks)
- b. The following readings of strain were obtained on a rectangular strain rosette mounted on aluminum for which $E=70\text{GPa}$, $\nu = 0.32$, $\epsilon_a = 285 \times 10^{-6}$, $\epsilon_b = 65 \times 10^{-6}$, $\epsilon_c = 102 \times 10^{-6}$. Determine the principal strains, principal strain direction, principal stresses and maximum shear stress. (08 Marks)

OR

- 4 a. List out the torque measurement methods. Explain Gravity balance method and Strain gauge torsion meter (08 Marks)
- b. With relevant sketch explain the working principle of unbonded resistance- strain gauge for strain measurement. (08 Marks)

MODULE – III

- 5 a. Explain the calibration technique used for photoelastic circular disc under diametral compression (08 Marks)
- b. What is meant by polarization? With a neat sketch explain Fringe multiplication Technique (08 Marks)

OR

- 6 a. List the commonly used stress separation techniques. Explain shear difference method (08 Marks)
- b. List the properties of 2D photoelastic model materials and material for 2D Photoelasticity. (08 Marks)

MODULE – IV

- 7 a. With a neat sketch explain stress freezing method (08 Marks)
- b. Describe briefly the scattered light method of photoelastic stress analysis. Specify the advantages and limitations of this method (08 Marks)

OR

- 8 a. Explain birefringent coating method (04 Marks)
- b. Derive an expression for stress and strain in the specimen in terms of coating thickness. (06 Marks)
- c. Explain the working of a reflection polariscope (06 Marks)

MODULE – V

- 9 a. With relevant sketches discuss the crack patterns which can be obtained in a brittle coating under various combination of stresses (08 Marks)
- b. Explain the principle of brittle coating technique and enumerate the advantages and disadvantages. (08 Marks)

OR

- 10 a. Explain briefly the phenomenon of Moiré techniques used for the analysis of stresses. (08 Marks)
- b. Explain with a neat sketch, the displacement field approach to Moiré – fringe analysis. (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 e.g., $38+2=40$, will be treated as malpractice.