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10ME761

Seventh Semester B.E. Degree Examination, June/July 2018

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. Briefly explain wheat stone bridge while deriving the condition of bridge balance. (10 Marks)
b. Explain environmental effect on performance of strain gauges. (10 Marks)
- 2 a. Briefly explain shear strain gauge with proper figures. (08 Marks)
b. What is strain rosette? Derive an expression in three element rectangular rosettes for principal strains and principal stresses. (12 Marks)
- 3 a. Describe the determination process of isoclinics, isochromatics and fringe order with a plane polariscope arrangement. (10 Marks)
b. Explain the effect of stressed model in plane polariscope. (10 Marks)
- 4 a. Explain shear difference method with proper sketches and equations applicable to two dimensional photo elasticity. (10 Marks)
b. What is a separation technique? Explain the below two methods:
i) Use of lateral extensometer
ii) At the free boundary (10 Marks)

PART – B

- 5 a. Describe the stress freezing technique in 3-D photoelasticity. (10 Marks)
b. Sketch and explain scattered light polariscope. (10 Marks)
- 6 a. Describe the theory of birefringent coatings. (10 Marks)
b. Show that the difference in principal stresses in a birefringent coating is linearly related to the difference in principal stresses acting on the surface of a loaded machine part. (10 Marks)
- 7 a. Explain brittle coating method with flat tension model as an example. (10 Marks)
b. Explain advantages and applications of brittle coating. (10 Marks)
- 8 a. Describe the general setup for Moire method of strain analysis for in plane problems. (10 Marks)
b. Describe the geometric approach in Moire fringe analysis considering the case of pure extension without rotation. (10 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.