B.E. (Mechanical) (Part - I) (Semester - VII)
Examination, May - 2017
EXPERIMENTAL MECHANICS (Elective - I)
Sub. Code :67504

Day and Date : Thursday, 18 - 05 - 2017

Time : 2.00 p.m. to 5.00 p.m.

Total Marks : 100

Instructions :
1) All Questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat diagram to supplement your answer wherever required.
4) Make suitable assumptions wherever necessary & state them clearly.
5) Use of non-programmable calculator is allowed.

Q1) a) Explain advantages and scope of Experimental Mechanics in design. [6]

b) With usual notations derive the stress optics law. What is its significance? [10]

Q2) a) Why the compensation techniques are necessary in photoelasticity? Explain any one method of compensation. [8]

b) What are Quarter wave plates? Why are they called so? Explain with sketches all the four configurations of circular polariscope indicating the relative orientation of axis of polarizer, analyzer and two quarter wave plates. [8]

OR

c) Explain Role of Polariscope in photoelasticity. [8]

Q3) Write short notes (any three) [18]

a) Use of white light and monochromatic light in photoelasticity.

b) Various configurations of polariscope.

c) Experimental stress analysis methods.

d) Calibration of photoelastic material.

P.T.O.

Q4) a) Explain the principle of Brittle coating method of stress analysis. Sketch the crack patterns under various conditions of stress. [8]

b) Explain the procedure bonding of the gauge on metallic surfaces. What checks are usually made on gauge installations? [8]

OR

c) Explain Moire Method with its advantages, limitations and applications. [8]

Q5) The following observations are made with rectangular rosette mounted on aluminum specimen. [16]

ε_A= 285 Microstrain ; ε_B= 65 Microstrain ; ε_C= 102 Microstrain.

Determine the principal strains. principal stress, principal strain directions and maximum shear stress. Assume E= 70 GPa and Poisson's Ratio = 0.32.

Q6) Write short notes (any three). [18]

a) Explain Two, Three and four element rosettes.

b) Temperature Compensation.

c) Transducer Applications of Strain Gauges.

d) Commercial Strain Indicators.

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