Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MVSE - 204

M.E./M.Tech., II Semester

Examination, June 2016

Experimental Stress Analysis

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume missing data suitably..

1. a) Discuss brittle coating techniques with sketches for strain analysis.
   b) Derive an expression for the gauge factor of an electric resistance strain gauge.

2. a) Discuss the method of gauge construction and gauge style.
   b) Show that the change in resistance which accompanies strain is due to geometrical changes of the resistive element and to changes in its specific resistivity.

3. Discuss in detail the following:
   a) Unbalanced bridge systems
   b) Magnetic tape recorders

4. a) Explain the calculation of the stress intensity factor by the method of sections.
   b) Find the critical stress for an infinite plate with a crack in loaded by two equal and opposite forces P, the distance between the points of application is 2L.

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5. a) Discuss in detail optical theory used in stress analysis.
   b) A 150ohm metal gauge having a gauge factor of 2.0 is mounted on a low carbon steel. What change in gauge resistance will be produced by straining the material to its yield point?

6. a) What are the various basic parameter on which the development of initial cracks in a body depend? Mention the mathematical problems of fracture mechanics whose situation depend on the above parameter.
   b) Describe basic modes of deformation of crack surfaces and explain the expressions for the stress and displacement fields in the vicinity of crack tip.

7. a) An infinite plane with a straight crack is subjected to a uniform uniaxial tensile stress σ at infinity. Determine the critical value of the stress σ at which the crack begins to propagate under constant external load. The crack is situated along the x-axis, $|x| \leq 1, y = 0$.
   b) Discuss some material characteristics used for the evaluation of crack propagation resistance.

8. Write notes on any two of the following:
   a) Stress optical relationship
   b) Multichannel recording systems
   c) Constant current strain indicators

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