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Reg. No: ……

Name : ……

Model Question Paper

Second Semester M.Tech Degree Examination, October 2014

(2013 Scheme)

Branch: Mechanical, Stream: Machine Design

MDE 2007: EXPERIMENTAL STRESS ANALYSIS

Time: 3 Hours Max. Marks: 60

Instructions: Answer ***any two*** questions from each Module

Module - I

1. a) Define the term principal strain.

   b) The principal strains acting on the steel component are 12με and 6με. Determine the principal stresses. (E=205 GPa $\upsilon = 0.32$) **(10)**

2. A material has direct stresses of 120 MPa tensile and 80 MPa compressive acting on mutually perpendicular planes .There is no shear stress on these planes. Draw Mohr's circle of stress and determine the stresses on a plane 20^o to the plane of the larger stress. **(10)**

3. The principal strains in a material are 500 με and 300 με. Calculate the direct strain and shears strain on a plain 30˚ anti clockwise of the first principal strain. **(10)**

Module - II

4. a) Define the terms photo elasticity and birefringence. **(3)**

   b) Explain stress optic law and obtain an expression for retardation in plane stress case **(7)**

5. With respect to brittle coating techniques , Explain

   a) The effect of refrigeration on brittle coatings **(3)**

P.T.O

b) Different crack patterns **(3)**

c) Various crack detection methods **(4)**

6. Explain dark field and bright field set up with respect to a plane polariscope **(10)**

Module - III

7. Explain the various strain rosette configurations. **(10)**

8. Explain the various steps involved in liquid penetrant testing. **(10)**

9. Explain the various methods in ultrasonic testing. **(10)**