

Code: MEMD2T4

**I M.Tech - II Semester - Regular Examinations - August 2014**

**EXPERIMENTAL STRESS ANALYSIS  
(MACHINE DESIGN)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) The stress components at a point are  $\sigma_x = -50$ ,  $\sigma_y = 30$ ,  
 $\sigma_z = 20$ ,  $\tau_{xy} = -60$ ,  $\tau_{yz} = 40$ ,  $\tau_{xz} = 50$  M.Pa. Determine the  
principle stresses and principle directions. 7 M
  
- b) Stress field is same for plane stress and plane strain  
problems. Why is it not so for displacement fields?  
Explain 5 M
  
- c) Explain the state of pure shear. 2 M
  
2. Determine the principal stresses and principal strains and  
the principal angles for a three element rectangular rosette  
when  $\varepsilon_A = 1800\mu\varepsilon$ ,  $\varepsilon_B = 600\varepsilon$ ,  $\varepsilon_C = -400\varepsilon$ . 14 M
  
3. Explain the devices used for recording intermediate  
frequency and very high frequency strain signals. 14 M

4. a) List the advantages and disadvantages of the brittle coating method. 7 M
- b) Explain calibration of brittle coatings. 7 M
5. Explain the displacement field approach to moire fringe analysis. 14 M
6. a) Explain isochromatic fringe patterns and isoclinic fringe patterns 8 M
- b) Explain separation methods in photo elasticity. 6 M
7. a) Explain shear difference method in three dimensions. 7 M
- b) Explain different materials for three dimensional photoelasticity. 7 M
8. What are the different properties of a coating materials and explain the effects of coating thickness. 14 M