Code No: 5115P **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II Semester Examinations, February - 2017
EXPERIMENTAL STRESS ANALYSIS
(Machine Design)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5 × 4 Marks = 20

1.a) What do you understand by plane stress and plane strain? Explain. [4]
b) Explain briefly about manual direct-reading strain indicator. [4]
c) Write short notes on ceramic based brittle coatings. [4]
d) Discuss briefly about photo elastic materials. [4]
e) What are the applications of birefringent coatings? [4]

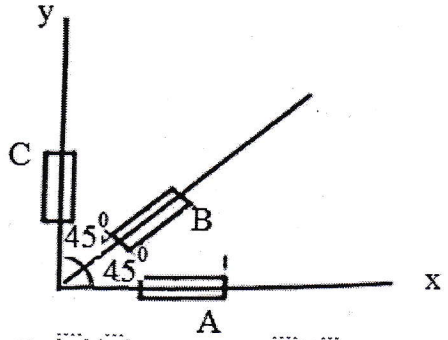
PART - B

5 × 8 Marks = 40

2.a) Write the equations of compatibility conditions.
b) What are the various types of strain gauges? Explain semiconductor strain gauges. [4+4]

OR

3. The following observations are made with a rectangular rosette mounted on a steel specimen. ϵ_A=800μm/m, ϵ_B= -100μm/m, ϵ_C= -900μm/m as shown in figure. Determine principal strains, principal stresses and principal angles $\emptyset_1$ and $\emptyset_2$ with respect to X-axis. For steel E = 200GPa and μ=0.3. [8]



4. What are the recording instruments for strain gauges? Explain how dynamic recording of high frequencies are measured. [8]

OR

5. Discuss how the higher frequencies are measured by Dynamic recording system. [8]

6. Explain the failure theories of brittle coatings. [8]

OR

7. What are the two techniques used for moire's fringe analysis? Discuss the displacement approach and geometrical approach in detail. [8]

8. Describe the effects of stressed model in a plane polariscope with a neat sketch. [8]

OR

9. Explain the compensation techniques in detail to determine the isochromatic fringe order. [8]

10. Discuss the following methods.
a) stress freezing techniques
b) curing method in locking model deformation. [4+4]

OR

11. Describe the scattered light method of photoelastic stress analysis. Discuss the advantages and limitations of this method. [8]

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