Printed Pages: 02 **Sub Code: NME061**

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B.TECH.
(SEM VIII) THEORY EXAMINATION 2017-18
EXPERIMENTAL STRESS ANALYSIS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

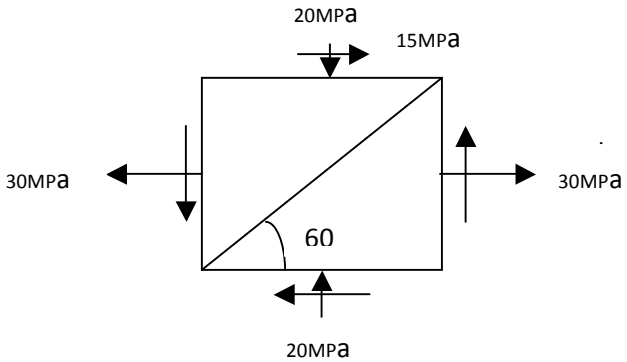
1. Attempt *all* questions in brief. 2 x 10 = 20

a. What do you understand by principal planes and principal Stresses?
b. Write the equation of equilibrium.
c. Enlist few methods of strain analysis.
d. What are Properties of Strain Gage Systems?
e. What do you understand by gauge factor?
f. What is strain Rosette?
g. What is Stress Optic Law?
h. What is Photo-elasticity?
i. What do you understand by Calibration?
j. Write different Fringe Patterns.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. At a point in a strained material, stress are applied as shown in figure, find out the normal, shear stress on the oblique plane and principal stresses in the object.



b. What are the basic characteristics of a Strain gauge? Write a brief note in electrical resistance strain gauges.
c. What are various crack detection methods?
d. With the help of neat sketches explain the function of each component of a circular polariscope with both dark and light field arrangements.
e. Explain the normal and oblique incidence methods as applied to birefringent coatings.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the principle of Strain gauge Rosettes. Compare the available Rosettes and their applications.

(b) Explain the principle of Strain gauge Transducers. With the help of neat sketch.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Derive an expression for Gauge factor of Electrical wire strain gauge.

(b) Discuss the crack patterns, which can be obtained under various combinations of stresses. Illustrate with neat sketches.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Derive a general expression for the output voltage of Wheatstone Bridge circuit for different strain gauge combinations.

(b) What is the importance of Temperature compensation in a strain gauge circuitry and how is it achieved?

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are neutral fringes?

(b) Explain in brief about Relative Retardation.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define Isoclinic and Isochromatic fringes.

(b) What is Oblique Incidence Method? Explain in brief.