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M.TECH

M.TECH 2<sup>ND</sup> SEMESTER (AR 18) REGULAR EXAMINATIONS, APRIL/MAY 2019  
**EXPERIMENTAL STRESS ANALYSIS**

Branch: MD, Subject Code:MMDPC2020

Time: 3 Hours

Max Marks : 70

(10 X 2=20 MARKS)

**PART-A****1. Answer the following questions.**

- What is a wave plate? How retardation is produced when light passing through it?
- Explain stress concentration and stress concentration factor in elasticity problems.
- Determine the strain, if the change in resistance per resistance of the gauge is  $2.5 \times 10^{-6}$  with a gauge factor of 6.
- What is dummy gauge?
- What is photo elastic effect?
- What is the direction of cracks when the coating fails?
- What is apparent stress?
- Distinguish between wire and foil gauges.
- What are weldable strain gauges?
- State the principle of 3D photo elasticity.

**PART-B**

(5 X 10=50 MARKS)

**Answer any five questions from the following.**

Q2. Explain separation technique in photoelastic method and name the various methods. With a neat sketch explain any two separation method in details. [10]

Q3.

- State and explain stress optic law? [5]
- Distinguish between isoclinics and isochromatics. How do you identify isoclinics from isochromatics when a loaded photoelastic model is placed in between the two wave plates? [5]

Q4.

- Show the arrangement of all optical elements in a circular polariscope. Explain how the circularly polarized light is available in this arrangement. [5]
- Discuss the half and full fringe orders in the above arrangements when a loaded photoelastic model is placed in between the two wave plates. [5]

Q5.

- Discuss various methods for calibrating a strain gauge. [5]
- In a resistance type bridge circuit the resistances are  $R_1 = 9800 \Omega$ ,  $R_2 = 8800 \Omega$ ,  $R_3 = 8500 \Omega$  and  $R_4 = 9000 \Omega$ . If the bridge is of voltage sensitive type and the input voltage is 12V, then what should be the meter reading? [5]

Q6.

- Explain the brittle coating method in brief. What are the advantages and limitations of this method? [5]
- Explain the grid method of strain analysis in brief. What are the advantages and limitations of this method? [5]

Q7.

- Define circuit sensitivity of the wheatstone bridge and make an analysis for circuit sensitivity of bridge bringing out clearly the important conclusions. [5]
- Why foil type gauges are preferred over wire type of gauges? [5]

Q8. Write short notes on:

- The core method [5]
- Stress freezing method [5]