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Roll No .....

MVSE - 204

M.E./M.Tech., II Semester

Examination, December 2015

Experimental Stress Analysis

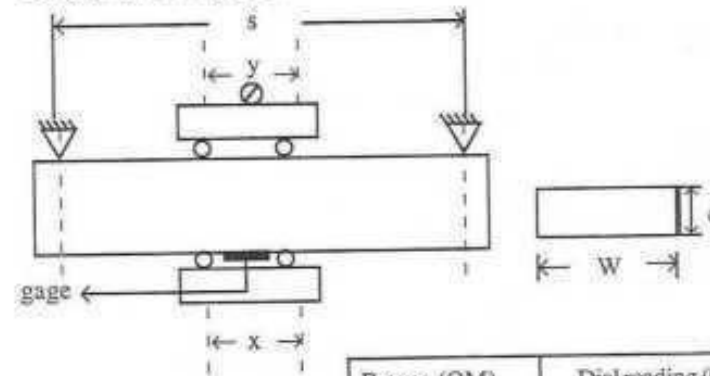
Time : Three Hours

Maximum Marks : 70

- Note: i) Attempt any five questions.  
 ii) All questions carry equal marks.  
 iii) Assume missing data suitably..

- Discuss mechanical strain gage in detail. What are the advantages of mechanical strain gages over all other types of strain gages.
  - Explain the moire fringe pattern that results from relative rotation of two grids.
- Discuss the strain-gage locations for various measured quantities.
  - Discuss the requirements of strain-sensitive material. What are the advantages of semiconductor strain gage over all other types of strain gages?
- Explain and classify the polarization of light.
  - Explain how you would make a circular polariscope, identify all its components and derive an expression for the intensity of the light wave in a dark field arrangement.
- Discuss the Griffith-Orowan-Irwin concept in detail. Also discuss the different conditions for crack growth.
- Discuss the integral variational principle in crack theory.

- Discuss the calculation of the stress intensity factor for double cantilever beam specimens by finite element method.
  - Find the critical stress for an infinite plane weakened by two cracks situated along the real axis. The length of the cracks are  $2l_1$  and  $2l_2$ . The uniform tensile stress is directed perpendicular to the crack line.
- A single strain gage is mounted on the centre of the aluminum bar. The bar is loaded with a constant moment section and the curvature is obtained by reading the dial indicator. As the bar is loaded gage resistance is measured by using a resistance measuring bridge. From the data given determine the gage factor for this gage.



$d = 5 \text{ mm}$   
 $w = 25 \text{ mm}$   
 $s = 300 \text{ mm}$   
 $x = 200 \text{ mm}$   
 $y = 150 \text{ mm}$

R gage (OM)	Dial reading (0.005mm)
121.3	0
120.7	10
120.2	20
119.5	30

- Write notes on any two of the following:
  - Temperature compensation of circuitry
  - Shell with a crack trajectory
  - Calculation of stress intensity factor by FEM

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