GIET UNIVERSITY, GUNUPUR – 765022

RD19MTECH012

Registration No: | | | | | | | | | | |

Total Number of Pages : 01 M.TECH

AR-19

M.TECH 1ST SEMESTER EXAMINATIONS NOV/DEC 2019

Branch: MD, MPCMD1010

ADVANCED STRESS ANALYSIS

Time: 3 Hours Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A (10 X 2=20 MARKS)

1. Answer the following questions.
   a) Define statement stress optic law?
   b) Write two advantages and limitations of moiré method?
   c) Determine the strain, if the change in resistance per resistance of the gauge is $2.5 * 10^{-6}$ with a gauge factor of 6.?
   d) Explain two methods of achieving temperature compensation in measurement of strain
   e) Write any three characteristics of strain gauge?
   f) What is apparent stress?
   g) What do you mean by static calibration of strain gauge?
   h) State the principle of 3D photo elasticity?
   i) What is wave plate? State its types?
   j) What do you mean doubly refracted material? Give two examples of such materials?

PART-B (5 X 10=50 MARKS)

Answer any five questions from the following.

2. A strain tensor is given as $[\varepsilon ij] = \begin{bmatrix} 0.002 & 0 & -0.002 \\ 0 & 0.002 & 0.002 \\ -0.002 & 0.002 & 0 \end{bmatrix}$
   Determine the stress tensor , if the values of elastic modulus and shear modulus of 2×10^{11} and 8×10^{10}N/m2 respectively ?

3. Explain the following rosette analysis
   (i) Two elements rosette analysis (ii) Rectangular rosette analysis

4. Write down the materials used and properties of material used for photo elastic models and draw the diagram of photo elastic model ?

5. Check whether the following strain tensor is compatible or not
   $\varepsilon x=12x^2 -6y^2-4z$
   $\varepsilon y=12y^2-6x^2+4z$
   $\varepsilon z=12x +4y-z+5$
   $\tau xy=4z -24xy-3$
   $\tau yz=y-z-4$
   $\tau zx=4x+4y-6$

6. Write down the materials used and properties of material used for photo elastic models and draw the diagram of photo elastic model ?

7. What do you mean by three dimensional photoelasticity? Explain in detail with a neat sketch about the Frozen stress method in 3-D ?

8. (a) Derive the expression for failure theory of the case $\sigma_c{}^x > 0 > \sigma_c{}^y$?
   (b) Explain the procedure for calibration of brittle coating ?

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