



GIET UNIVERSITY, GUNUPUR - 765022
M. Tech (First Semester) Examinations, January - 2024
MPCMD1010 - Advanced Stress Analysis
(Machine Design)

Time: 3 Hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

Q.1. Answer all questions	CO#	Blooms Level
a. Which method is used for separation of principal stresses?	CO3	K1
b. Define fringe spacing.	CO4	K1
c. Differentiate between ordinary and monochromatic light.	CO2	K1
d. Define Stress optic law	CO2	K1
e. Define isoclinics and isochromatics	CO1	K2
f. Define sensitivity index and figure of merit of a photoelastic material.	CO4	K1
g. Define known as foil strain gauges.	CO3	K1
h. Give the advantages of strain Rosette analysis.	CO1	K1
i. Define a stress trajectory.	CO4	K1
j. Who discovered the photoelastic effect and when?	CO4	K2

PART – B**(10 x 5=50 Marks)**Answer ANY FIVE questions

	Marks	CO#	Blooms Level
2.a. Describe in detail the working principle and limitations of a linear variable differential transformer with a neat sketch.	5	CO1	K2
b. Write short notes on bonding of strain gauge.	5	CO1	K2
3.a. Define gauge factor and derive an expression for it.	5	CO2	K3
b. Explain briefly the following terms:(i) Calibration (ii) System response (iii) Types of experimental errors (iv) SR-gauges	5	CO2	K3
4. a. Explain the shear difference method for the separation of principal stresses.	5	CO3	K3
b. Define birefringence. Explain how stresses and strains can be measured using birefringent coating. List various assumptions made.	5	CO3	K3
5. Determine the magnitude and direction of light vector emerging from a series combination of linear polarizer and half wave plate oriented at an arbitrary angle θ with respect to the plane of vibration of the linear polarizer.	10	CO4	K3
6. a. Describe neutral fringes.	5	CO4	K2

b.	Describe the two techniques used for moiré-fringe analysis. Discuss the displacement approach in detail.	5	CO3	K3
7.	With the help of neat sketches explain the function of each component of a Circular Polariscope with both dark and light field arrangements.	10	CO3	K3
8.a.	Describe various crack detection methods.	5	CO4	K3
b.	Discuss the crack patterns which can be obtained under various combinations of stresses. Illustrate with neat sketches.	5	CO4	K2

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