Registration No :

Total Number of Pages : 02

M.Tech
P2MDCC10

2nd Semester Regular / Back Examination 2018-19
EXPERIMENTAL STRESS ANALYSIS
BRANCH : MACHINE DESIGN, MECH. SYSTEM DESIGN
Max Marks : 100
Time : 3 Hours
Q.CODE : F432
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   **Only Short Answer Type Questions (Answer All-10)**   **(2 x 10)**

a) What are the material used for resistance typ strain gauges?

b) Define strain sensitivity and gage factor?

c) State and difference between plane stress and plane strain problem.

d) State advantages of metal foil strain gage over bonded wire strain gage.

e) Explain the stress optic law.

f) Name the differentr material used in brittle boating method.

g) State two method of separation of principal stresses in two dimensional photoelasticity.

h) Explain refference array in Moire fringe technique.

i) What is the method of compensation in photo elasticity analysis method?

j) What are isocline and isochromatics?

Part- II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**

a) Explain potentiometer circuit for strain measurement.

b) What are strain rosette? Give the configuration of star and delta strain rosette.

c) What is meant by null balance and why it is needed at the beginning of the experiment?

d) Explain the use of monochromatic and white light in photoelastic experiment.

e) Discuss the advantages and limitations of brittle coating method.

f) Explain the use of plane polariscope.

g) Explain the circular polariscope?

h) State parameters for consideration for a good photoelastic material.

i) What is reflection polariscope? Explain

j) Explain the Frozen stress method of 3D photoelasticity

k) Expalin the use of semiconductor strain gauges

l) Explain the Grid method of strain analysis.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   Readings of a strain rosette are : $\varepsilon_0 = 600 \times 10^{-6}$, $\varepsilon_{45} = -150 \times 10^{-6}$, $\varepsilon_{120} = 250 \times 10^{-6}$.   **(16)**
Find the magnitude and direction of principal strains. Also find the principal stresses.
(Take E= 205 GPa and v=0.3).

Q4   Explain the WSB circuit used for strain measurement, and derive the expression for   **(16)**
the gage factor and gage sensitivity. Also explain the provission of temperature
comensation in the same circuit.

Q5   Discuss the geometric approach of Moire fringe strain anlysis. Describe the approach   **(16)**
to measure normal strain and shear strain using the Moire-fringe effect.

Q6   Explain the brittle coating method for strain and stress analysis. Also explain the   **(16)**
callibration method.