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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

First Semester - M.Tech. Mechanical Engineering (MMDN)

Make-up Examination; Feb - 2017

Experimental Mechanics

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.*
ii) Assume missing data if any.

UNIT - I

1 a. Explain zero order instrument and first order instrument. 10

b. Explain method of least square and chi-square test. 10

2 a. Define the following:

i) Accuracy ii) Calibration iii) Dimension 10

iv)Binomial distribution v) Second order instrument

b. Explain the components of acquisition and processing system with block diagram. 10

UNIT - II

3 a. A rectangular strain gauge rosette is bonded at a critical point on to the surface of a structural member. When the structural member is loaded the strain gauges show the following reading. $\dot{\varepsilon}_0 = 850\mu m/m$, ε_{45} = -50 μm/m, ε_{90} = - 850 μm/m. The gauge factor and cross sensitivity of the gauges are 2.80 and 0.06. Find; 10

i) Actual strains

ii) Magnitude and directions of corrected Principal strains.

iii) The error, if indicated strains $\varepsilon_0, \varepsilon_{45}, \varepsilon_{90}$ are used to calculate the principal stresses given E = 200 GPa and Poisson's ratio of 0.285

b. Define Gauge factor and Derive an expression for Gauge factor for an electrical resistance strain gauge. 10

4 a. Explain Potentiometer with neat circuit diagram. List the equation of potentiometer range and sensitivity. 10

b. Explain the characteristics of a strain gauge. 8

c. What is LVDT and where it is used. 2

UNIT - III

5 a. Discuss the effect of stressed model in a circular Polariscope with dark field arrangement. 10

b. Explain the shear difference method for the separation of principal stresses. 10

Contd….2

6 a.	Explain with neat sketches plane Polariscope.	10
b.	Explain the fringe sharpening with partial mirrors.	10

UNIT - IV

7 a.	Explain briefly oblique-Incidence method for separation of principal stresses in birefringent method.	10
b.	Explain Brittle coating crack patterns with neat sketches.	10
8 a.	Explain reflection Polari scope	10
b.	List the assumptions made in brittle costing and explain coating stresses.	10

UNIT - V

9 a.	Explain spatial coherence with the help of interferometer.	10
b.	Explain general Moire technique for strain analysis by the displacement approach.	10
10 a.	Discuss holographic interferometry.	10
b.	Sketch and explain Moire phenomenon.	10

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