CBCS Scheme

USN ☐☐☐☐☐☐☐☐☐☐

16/17CAE14

First Semester M.Tech. Degree Examination, June/July 2018
Experimental Mechanics

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

1 a. Explain in brief the following terms:
   i) Calibration
   ii) Distortion
   iii) System response
   iv) Characteristics of measurement under dynamic conditions. **(08 Marks)**

   b. A certain thermometer has a time constant of 15 sec and an initial temperature of 20°C. It is suddenly exposed to a temperature of 100°C. Determine the time to attain 90% of steady state value and the temperature at this time. If the frequency of the system is 0.01Hz. What is the time delay in the response of the thermometer? **(08 Marks)**

OR

2 a. Explain briefly the following:
   i) Types of errors
   ii) Statistical analysis of experimental data. **(08 Marks)**

   b. The following readings are taken of a certain physical length. Compute the mean reading standard deviation, variance and average of the absolute value of the deviation using the biased basis:

Reading	1	2	3	4	5	6	7	8	9	10
x cm	5.30	5.73	6.77	5.26	4.33	5.45	6.09	5.64	5.81	5.75

(08 Marks)

Module-2

3 a. Explain the data acquisition system of a nuclear power plant as a program substitute for wired logic. **(08 Marks)**

   b. What are the types of A/D converters? With a neat sketch explain successive approximation converter. **(08 Marks)**

OR

4 a. With a neat sketch, explain three-element rectangular rosette. **(08 Marks)**

   b. The following readings of strains were obtained on a rectangular strain Rosette mounted on aluminium for which E = 70GPa, $\mu = 0.32$, $\in_a = 285 \times 10^{-6}$, $\in_b = 65 \times 10^{-6}$, $\in_c = 102 \times 10^{-6}$. Determine principal strains, principal strain directions, principal stresses and maximum shear stress. **(08 Marks)**

Module-3

5 a. Explain calibration of photo elastic model material using a circular disc under diametral compression. **(08 Marks)**

   b. Explain Tardy's method of compensation. **(08 Marks)**

OR

6 a. Establish the stress optic relation for 2D photo elasticity.   (08 Marks)
   b. What are isochromatics and isoclinics with a neat sketch, explain circular polariscope light field arrangements.   (08 Marks)

Module-4

7 a. Explain stress freezing techniques for 3D-photoelasticity.   (08 Marks)
   b. With a neat sketch, explain the phenomenon of scattered light photoelasticity by using polariscope.   (08 Marks)

OR

8 a. Derive the equation for effective stresses at a point in a 3D model.   (08 Marks)
   b. Explain the shear difference method with a neat sketch.   (08 Marks)

Module-5

9 a. What is photo elastic coating? List the advantages and applications of photo elastic coating.   (08 Marks)
   b. Explain the following types of Brittle coatings:
       i)   Resin based coating (stress coat)
       ii)   Ceramic based coating (All Temp).   (08 Marks)

OR

10 Write a note on:
    a. Hurter Driffield curve.
    b. Holographic set up and reconstruction process of images in holography.   (16 Marks)

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