Roll No. ⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕   **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech.(IE) (ALL)/(ME) (Sem.–5)
MECHANICAL MEASUREMENT AND METROLOGY
Subject Code : ME-307
Paper ID : [A0817]

Time : 3 Hrs.   **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

   a) List the functional elements of a measurement system.

   b) How is primary measurement standard different from secondary measurement standard?

   c) Explain the concept of calibration.

   d) Give a classification of errors in measurement.

   e) How do you define surface roughness?

   f) What is speed of response of a measuring instrument?

   g) What is the purpose hot wire anemometer?

   h) How do you measure vibration of a body?

   i) What is the role of temperature compensation in a measuring instrument?

   j) How does a transmission dynamometer measure the Torque?

SECTION-B

2. Explain the application of following devices.

   (i) Amplifier

   (ii) Transducer.

3. What is the influence of damping ratio in a second order instrument? Explain with an example.

4. What is the purpose piezo-electric accelerator? Explain.

5. Explain the principle and working of a hydraulic load cell.

6. How do you measure High pressures? Explain the system used.

SECTION-C

7. Discuss the various sources of errors in measurement. What precautions/efforts must be made to minimize/eliminate them?

8. A second order pressure transducer has a natural frequency of 1000 rad/s and damping ratio of 0.3. Its static sensitivity is 0.02 v/bar. A pressure pulse is applied to the transducer as shown. Using Fourier transform method plot the frequency response of input pressure signal and throutput voltage.
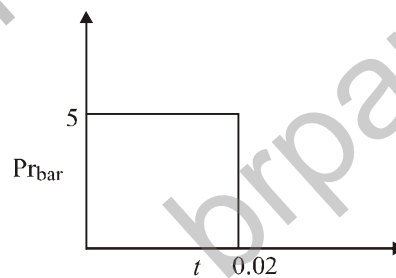

Fig.

9. Write short notes on the following :

   (i) Curve Fitting

   (ii) Thread Measurements.

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