

**B.Tech. - VIEP - MECHANICAL ENGINEERING
(BTMEVI)**

00453

Term-End Examination

December, 2018

**BIMEE-015 : INDUSTRIAL MEASUREMENT AND
QUALITY CONTROL**

Time : 3 hours

Maximum Marks : 70

Note : Answer any five questions. All questions carry equal marks. Use of scientific calculator is permitted.

1. (a) Explain the functions of a mechanical strain gauge with a neat sketch. 7
- (b) Describe strain gauge rosettes. 7
2. (a) Name different methods used to measure vibrations. Explain any one method. 7
- (b) Name various types of instruments used for speed measurement. Explain the working principle of any one method. 7

3. (a) What is the function of thermocouple ? Explain different types of materials used in thermocouples and their properties. 7
- (b) A 100 Ω strain gauge is bonded to a low carbon steel bar which has been subjected to a tensile load. The bar has a preload uniform cross-sectional area of $0.5 \times 10^{-4} \text{ m}^2$ and Young's modulus for low carbon steel is 200 GN/m². If a load 50 kN produces a change of 1 Ω in the gauge resistance, determine the gauge factor for the strain gauge. 7
4. (a) Describe with a neat sketch, the working principle of an optical pyrometer. 7
- (b) Explain the static and dynamic characteristics of a measuring instrument. 7
5. (a) List the various methods that are available for level measurement. Explain level measurement by the electrical conductivity method. 7
- (b) How do you classify transducers ? Explain the working of a hydro-pneumatic transducer. 7
6. (a) Differentiate between systematic and random errors involved in measurement. Name the typical sources of these errors. 7
- (b) Describe Gyroscopic devices used in the measurement of angular motion. 7

7. Write short notes on any *four* of the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Force Sensors
 - (b) Thermistors
 - (c) Accelerometers
 - (d) Stroboscopes
 - (e) Generalised data acquisition systems
 - (f) Peltier Effect
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