

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

Term-End Examination

June, 2014

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

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks.

1. (a) What are the various problems associated with load measurement using strain gauges? Explain in brief, working of optical strain gauges. 7
- (b) A strain gauge of gauge factor 2.1 and a resistance of 115.15Ω is glued to a structure. On loading the structure the resistance changes to 115.2Ω . Estimate the stress. Use $E=205 \text{ GPa}$. 7
2. (a) How is temperature error eliminated in a strain gauge bridge? Explain with suitable diagram. 7
- (b) With appropriate examples explain : Precision, Sensitivity, Resolution and Repeatability of a measuring instrument. 7
3. (a) Name various methods available for vibration amplification. Explain any one of them in detail. 7
- (b) Name various types of instruments used for speed measurement. Explain working of magnetic tachometer. 7

4. (a) Explain the following terms related to thermocouple : Seebeck effect, Thomson effect and Thermofiles. 7
- (b) Explain any one method for non - contact type temperature measurement. 7
5. (a) Name different techniques available for elemental analysis. Explain any one of them in detail. 7
- (b) List various methods that are available for level measurement. Explain briefly, level measurement by electrical conductivity method. 7
6. (a) Explain the static characteristics of a measuring instrument. 7
- (b) Define the term transducer. Explain in detail different types of transducers. 7
7. Write short notes on any four of the following : 3½x4=14
- (a) Force sensors
- (b) Electropneumatic actuators
- (c) Strain Gauge Rosette
- (d) Measurement of vibration
- (e) Speed measurement by optical method
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