

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

Term-End Examination

00984

June, 2017

**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.

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1. (a) What are the various problems associated with load measurement using strain gauges ? Explain the working of an optical strain gauge. 7
 - (b) Explain unbounded strain gauges. What is an elastic material ? List some good examples of highly elastic materials. 7
 2. (a) Describe the working of mechanical and electrical tachometers. 7

- (b) A thermometer is initially at a temperature of 20°C and is suddenly plunged into a liquid bath, which is maintained at 150°C . The thermometer indicated 95°C after a time interval of 3 seconds. Estimate the time constant for the thermometer. Also calculate the indicated temperature after five time constants and comment upon this result. 7
3. (a) What are thermocouples ? Explain different types of materials used in thermocouples and their properties. 7
- (b) How is temperature error eliminated in a strain gauge bridge ? Explain with suitable diagram. 7
4. (a) Name the various methods available for vibration amplification. Explain any one of them in detail. 7
- (b) Explain the static and dynamic characteristics of a measuring instrument. 7
5. (a) Name the different techniques available for elemental analysis. Explain any one of them in detail. 7
- (b) List the various methods that are available for level measurement. Explain level measurement by the electrical conductivity method. 7

6. (a) Differentiate between the systematic and random errors involved in measurement. Name the typical sources of these errors. 7
- (b) Explain the working of an absorption spectrometer with a neat sketch. 7
7. Write short notes on any **four** of the following : $4 \times 3 \frac{1}{2} = 14$
- (a) Peltier Effect
 - (b) Pyrometer
 - (c) Mechano-electrical Transformation
 - (d) Strain Gauge Rosette
 - (e) Electropneumatic Actuator
 - (f) Thermistor
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