

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

Term-End Examination

June, 2016

00840

BIME-019 : METROLOGY

Time : 3 hours

Maximum Marks : 70

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

1. (a) Define measurement. Explain its significance in various fields of engineering. 7
- (b) Write the functions of a sensing element, signal conditioner and indicating element of a measuring instrument. 7
2. (a) Distinguish between accuracy and precision. Which of these are more desirable during the act of a measurement and why? 7
- (b) What are the different sources of errors in measurement and measuring instruments? Explain. 7

3. (a) What are the angle gauges ? How are they applied in measurements ? 7
- (b) A thermocouple system with a time constant of 8 seconds has been used to measure the temperature of a furnace whose temperature fluctuates sinusoidally between 400°C and 450°C with a periodic time of 60 seconds. Determine the maximum and minimum values that will be indicated by the thermocouple. Calculate the phase angle and the corresponding time lag between the temperature signals and the thermocouple output signals. 7
4. (a) Explain the following briefly : 7
- (i) Tool-maker's microscope
- (ii) Workshop microscope
- (b) Describe the working of an interferometer with the help of a neat diagram. 7
5. (a) Describe about the 'base tangent method' used for measuring gear tooth thickness. 7
- (b) Explain the three-wire method of measuring effective diameter of a screw thread. 7
6. (a) Define statistical quality control. What are control charts ? Explain with examples. 7
- (b) Describe the construction and working of an auto-collimator with a neat sketch. 7

7. Write short notes on any *four* of the following : $4 \times 3 \frac{1}{2} = 14$

- (a) Sampling Plans
 - (b) Tolerance
 - (c) Working Standards
 - (d) Sensitivity
 - (e) Interference Fits
 - (f) Surface Finish
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