

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

**Term-End Examination**

**June, 2017**

00034

**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) What do you mean by error in measurement? Classify errors and explain them. 7
- (b) Sketch a vernier caliper showing main scale and vernier scale. Define least count of a vernier caliper and explain how diameter of a bar is measured. 7
2. (a) Distinguish between accuracy and precision. Which of these are more desirable during the act of measurement? 7
- (b) Name the instruments for measuring dimensions that are based on optical principles. What are the principles of optical projector? 7

3. (a) What is a comparator ? Classify the different types of comparators. Describe the advantages and disadvantages of each type. 7
- (b) Explain the difference between threshold and resolution. 7
4. (a) Describe the co-ordinate measuring machine (CMM) and its main elements. 7
- (b) A thermometer is initially at a temperature of  $20^{\circ}\text{C}$  and is suddenly plunged into a liquid bath, which is maintained at  $150^{\circ}\text{C}$ . The thermometer indicated  $95^{\circ}\text{C}$  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
5. (a) Explain the three-wire method of measuring the effective diameter of a screw thread. 7
- (b) Describe the 'base tangent method' used for measuring gear tooth thickness. 7
6. (a) Explain the construction and working of an autocollimator. 7
- (b) Define statistical quality control. What are control charts ? Explain. 7

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

- (a) Sensitivity
  - (b) Interference Fits
  - (c) Sampling Plan
  - (d) Surface Finish
  - (e) Allowance
  - (f) Nominal Size
- 

