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BIME-019

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

Term-End Examination

00842

December, 2017

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 are Primary, Secondary and Tertiary measurements ? Explain with examples. 7

(b) Define Sensitivity. Would you prefer sensitivity be low or high for an instrument ? Justify. 7

2. (a) What are the different sources of errors in measurements and measuring instruments ? Explain. 7

(b) Draw a block diagram representation of a generalised measurement system. Identify the various elements and point out the functions performed by each element. 7

3. (a) What are Angle Gauges ? How are they applied in measurements ? 7

(b) Explain the following briefly : 7

(i) Toolmaker's microscope

(ii) Workshop microscope

4. (a) Explain the repeatability of a measuring instrument. How will you check the repeatability of an instrument ? 7

(b) The temperature of air during a particular process is cycling at the rate of 1 cycle every 5 minutes. The temperature sensing device used to measure this temperature has a time constant of 25 seconds. What would be the variation if the indicated temperature has a sinusoidal variation of $\pm$ 30°C ? Also determine the time by which the maximum reading of the thermometer lags the true maximum value. 7

5. (a) Define Surface Finish. Explain with the help of suitable examples, the adverse effects of poor surface finish. 7

(b) What are the different types of micrometers ? Explain any one in detail. 7

6. (a) Explain the working of a pitch measuring machine with a neat sketch. 7

(b) What are the control charts for attributes ? Explain any one. 7

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

(a) Visual Inspection

(b) Continuous Sampling Plan

(c) Working Standard

(d) Ring Screw Gauges

(e) Profile Projector

(f) Mechanical Comparator