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BIME-019

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

Term-End Examination

00521

June, 2019

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

(b) Distinguish between accuracy and precision. Which of these are more desirable during measurement ? Why ? 7

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

(b) Name the instruments for measuring dimensions that are based on optical principles. Write 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) Describe the working of an interferometer with the help of a neat diagram. 7

4. (a) Explain the three-wire method of measuring effective diameter of a screw thread. 7

(b) A pressure gauge having a range of 1000 kN/m^2 has guaranteed accuracy of 1% of full scale deflection.

(i) What would be the possible readings for a true value of 100 kN/m^2 ?

(ii) Estimate the possible readings, if the instrument has an error of 1% of the value. 7

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

(b) Define statistical quality control. What are control charts ? Explain. 7

6. (a) Describe the construction and working of an auto-collimator with a neat sketch. 7

(b) How can taper holes and taper shafts be checked ? Briefly explain. 7

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

(a) Sampling Plans

(b) Sensitivity

(c) Surface Finish

(d) Allowance

(e) Visual Inspection

(f) Environmental Error