No. of Printed Pages : 3

BIME-019

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

00196

Term-End Examination

June, 2015

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) Discuss primary, secondary and tertiary length standard.

(b) Define the following :

(i) Nominal Size

(ii) Basic Dimension

(iii) Tolerance

(iv) Upper Deviation

(v) Fit

(vi) Allowance

(vii) Sampling Plan 7+7

2. (a) What are the sources of errors during measurement ? Explain them briefly. Distinguish between 'Controllable errors' and 'Random errors'.

(b) Draw a neat sketch of a Vernier depth gauge and explain its construction and working. 7+7

3. (a) Enumerate the sources of errors in micrometers. What precautions should be observed while using the micrometer ?

(b) List down the different types of micrometers and explain with neat sketches any one of them. 7+7

4. (a) What is a sine bar ? Name the materials of which it is made up. Explain with the help of a diagram, the principle of a sine bar.

(b) Explain three-wire methods of measuring effective diameter of a screw thread. 7+7

5. (a) Describe how can the pitch of a screw thread be measured on a pitch measuring machine.

(b) What do you mean by ' Statistical Quality Control' ? What are Control Charts ? Explain. 7+7

6. (a) Explain with a neat sketch the working of an optical comparator.

(b) Describe toolmaker's microscope with the help of a neat sketch and state its applications. 7+7

7. (a) Describe autocollimator. On what principles does it work ? Describe an optical autocollimator.

(b) A hole is dimensioned as $25^{+0.033}_{+0.0}$ mm and the shaft is dimensioned as $25^{-0.040}_{-0.061}$ mm. Determine the hole tolerance, the shaft tolerance and allowance of the fit. What type of fit shall be established ? 7+7