

CBCS Scheme

USN

--	--	--	--	--	--	--	--	--	--

15ME36B

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017 Mechanical Measurements and Metrology

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Define the term metrology. List the objectives of measurement system. (05 Marks)
b. Explain line and end standards. (06 Marks)
c. Three 100mm end bars measured on a level comparator by first wringing them together and comparing with a 300mm bar. The 300mm bar has a known error of $+40\mu\text{m}$ and the three bars together measure $64\mu\text{m}$ less than the 300mm bar. Bar A is $18\mu\text{m}$ longer than bar B and $23\mu\text{m}$ longer than bar C. Find the actual length of each bar. (05 Marks)

OR

- 2 a. Select the size of angle gauges required to build the following angles, also sketch the arrangement of sample i) $37^{\circ}16'42''$ ii) $35^{\circ}32'36''$ (06 Marks)
b. Sketch and explain sine bar. (04 Marks)
c. Explain the principle of autocollimeter with the help of a neat sketch. (06 Marks)

Module-2

- 3 a. Explain briefly the different types of fit and show them by neat schematic diagrams. (08 Marks)
b. Explain with neat sketch the significance of hole basis and shaft basis system. (08 Marks)

OR

- 4 a. Describe with neat sketch working of LVDT. Also write the advantages and disadvantages of LVDT. (08 Marks)
b. With neat sketch describe the construction and working of sigma comparator. (08 Marks)

Module-3

- 5 a. Explain with neat sketch the method of measuring minor diameter of external thread. (08 Marks)
b. Explain with neat sketch of Tool maker's microscope. (08 Marks)

OR

- 6 a. Explain with a neat sketch, Gear tooth thickness measurement using gear tooth vernier. (08 Marks)
b. Explain with neat sketch the construction and working principle of CMM, also write the applications. (08 Marks)

Module-4

- 7 a. Briefly explain the following terms :
i) Hysteresis ii) Accuracy iii) Precision iv) Threshold. (08 Marks)
b. Briefly explain the generalized measurement system with block diagram with an example. (08 Marks)

Important Note: 1. In completing your answers, commensurate draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 8 a. What is CRO? Explain with sketch the principle and working of CRO. (10 Marks)
b. What is Ballast circuit? Explain. (06 Marks)

Module-5

- 9 a. Explain briefly with a neat sketch working of
i) Proving Ring ii) Prone brake dynameter. (08 Marks)
b. Explain with neat sketch the working principle of Mclead gauge. (08 Marks)

OR

- 10 a. What are the different methods of strain measurement? Explain mechanical strain gauge. (08 Marks)
b. With neat sketch explain the working principle of optical pyrometer. (08 Marks)

* * * * *