

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

00323

Term-End Examination

June, 2018

BME-014 : METROLOGY AND INSTRUMENTATION

Time : 3 hours

Maximum Marks : 70

Note : Answer any seven questions. All questions carry equal marks.

1. (a) Why are tolerances provided on dimensions of the components ? Explain.
- (b) Define Metrology. What is the necessity and importance of metrology ? 5+5

2. (a) What are the systems of specifying tolerances ? Explain.
- (b) Define the terms "Precision" and "Accuracy" and describe the methods to achieve them. 5+5

3. (a) List the various steps to care for and handle measuring instruments.
- (b) Explain any *two* of the following gauges : 5+5
- (i) Snap gauges
 - (ii) Plug gauges
 - (iii) Dial gauges
4. (a) Explain the construction and working of a vernier height gauge with the help of a neat sketch.
- (b) What precautions should be taken while using a vernier height gauge ? 5+5
5. (a) Give the description of an outside micrometer. How is it read ?
- (b) Explain with a neat sketch the working of an optical comparator. 5+5
6. (a) Explain with the help of a diagram the principle of a sine bar.
- (b) Discuss the working principle of a spirit level with the help of a neat sketch. 5+5
7. (a) Define the following terms :
- (i) Arithmetic mean
 - (ii) Median
 - (iii) Mode
 - (iv) Geometric mean
 - (v) Harmonic mean

(b) Name the various types of comparators used in industry. Explain any one type of comparator with a neat sketch. 5+5

8. (a) Explain the phenomenon of optical interference with a suitable sketch.

(b) A hole is dimensioned as

hole dia : $100^{+0.050}_{-0.025}$, and the shaft is dimensioned as

shaft dia : $100^{+0.055}_{+0.050}$. Determine the hole tolerance, the shaft tolerance and allowance of the fit. What type of fit shall be established? 5+5