

B.E./B.TECH. Degree Examination, December 2020

Fifth Semester

**ME16504-METROLOGY AND MEASUREMENT**

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

**PART A - (8 X 2 = 16 marks)**

1. What is the advantage of mechanical comparator over others?  
a) Less moving parts, b) No need of external supply, c) No error due to parallax  
d) Large range of instrument.
2. Which of the following is not true for autocollimators?  
a) Has an infinity telescope, b) Has an autocollimator, c) For smaller angle it is not accurate,  
d) Very high sensitivity
3. Which of the following is not a name of the major diameter of an external thread?  
a) Outside diameter, b) Crest diameter, c) Full diameter, d) Cone diameter
4. How many measurement parameters are considered in checking axes accuracy of straightness in CMM?  
a) 2, b) 4, c) 6, d) 8
5. Write down the difference between precision and accuracy.
6. Describe how the Least Count is calculated for micrometer.
7. Machine vision is applicable for both linear and angular measurements – TRUE/ FALSE.  
Justify.
8. Bimetallic strips used to measure the temperature- TRUE/ FALSE.- Justify.

**PART B - (4 X16 = 64 marks)**

09. (a) (i) Explain how the primary standard differ from secondary standard? Also (8)  
discuss where the working standards are used?  
(ii) Draw the block diagram of a generalized measuring system and explain the (8)  
different stages with an example.
- (OR)**
- (b) (i) Explain why calibration is essential for measuring devices. Justify with (4)  
suitable examples.  
(ii) Discuss the types of error and their sources with suitable example. (12)

10. (a) (i) Write the constructional requirement of the sine bar for accurate measurement. (12)  
(ii) A 100mm sine bar was used to measure the taper angle of the specimen and gauge block was 5.055 mm. What is the taper angle? (4)

**(OR)**

- (b) (i) Explain the construction and working of bevel protractor with neat sketch and discuss its applications. (8)  
(ii) Discuss any two applications of Autocollimator with neat sketch. (8)
11. (a) (i) Explain the construction and working of AC laser interferometer with neat sketch. (10)  
(ii) State any two applications of laser interferometer in machine tool metrology. (6)

**(OR)**

- (b) (i) Discuss the need, types and constructional features of coordinate measuring machine. (10)  
(ii) List any four possible causes of error in CMM. (6)
12. (a) (i) How to check the composite error of the gear by using Parkinson gear testing machine? (8)  
(ii) Derive an expression for estimation of best size wire. (8)

**(OR)**

- (b) (i) Discuss the construction and working of rotameter with neat sketch. (8)  
(ii) Explain the working of an optical pyrometer with suitable sketch. (8)