

# CBCS SCHEME

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15MA46

## Fourth Semester B.E. Degree Examination, June/July 2019 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. Explain methods of measurements. (05 Marks)  
b. List the objectives of Metrology. Also explain the need for inspection. (05 Marks)  
c. Explain the characteristics of wavelength standards, end standards and line standards. (06 Marks)

OR

- 2 a. Explain wringing phenomena. (02 Marks)  
b. List the slips to be wrung together to produce an overall dimension of 92.357mm using two protection slips of 2.500mm size. Show gauge combination. (03 Marks)  
c. Sketch and explain sine bar. (04 Marks)  
d. Explain the principle of autocollimator with a neat sketch. (07 Marks)

### Module-2

- 3 a. List and explain different types of fits with neat sketch. (03 Marks)  
b. Explain the terms:  
i) Interchangeability  
ii) Geometric tolerance  
iii) Position tolerance. (06 Marks)  
c. Sketch and explain the significance of hole basis system and shaft basis system. (07 Marks)

OR

- 4 a. Define comparators and write the classifications of comparators. (04 Marks)  
b. Sketch and explain the construction and working of LVDT. (06 Marks)  
c. Sketch and explain the construction and working of Zeiss ultra optimeter. (06 Marks)

### Module-3

- 5 a. Explain with a neat sketch of screw thread terminology. (04 Marks)  
b. Sketch and explain the gear tooth terminology. (06 Marks)  
c. Explain with a neat sketch of tool maker's microscope. (06 Marks)

OR

- 6 a. Explain LASER interferometers. List the advantages, types and applications of LASER interferometers. (08 Marks)  
b. Sketch and explain the construction and working principle of CMM. Write the applications of CMM. (08 Marks)

### Module-4

- 7 a. Explain the generalized measurement system with block diagram. (06 Marks)  
b. Define errors in measurement. Explain the classification of errors. (04 Marks)  
c. Explain the following: i) Accuracy ii) Precision iii) Hysteresis. (06 Marks)

OR

- 8 a. Define transducers. Explain primary and secondary transducers with block diagram. List the advantages and disadvantages of transducers. (08 Marks)
- b. Sketch and explain the construction and working of CRO. (08 Marks)

Module-5

- 9 a. Sketch and explain the construction and working of i) Prony brake dynamometer  
ii) Proving ring. (08 Marks)
- b. Sketch and explain the construction of McLeod gauge. Also write the advantages and disadvantages of McLeod gauge. (08 Marks)

OR

- 10 a. Sketch and explain Johansson extensometer. Write its advantages and disadvantages. (06 Marks)
- b. Explain thermocouple. Also explain the laws of thermocouple. (04 Marks)
- c. Sketch and explain the construction and working of topical pyrometer. (06 Marks)

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