



CBCS SCHEME

18ME46B/18MEB406

Fourth Semester B.E. Degree Examination, June/July 2024 Mechanical Measurements and Metrology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define Metrology. State and explain the objectives of metrology. (07 Marks)
b. Explain with necessary sketch the imperial standard yard. Highlight the significance of Airy points. (08 Marks)
c. A calibrated metre end bar has an actual length of 1000.03mm. It is to be used in the calibration of two bars A and B each having a basic length of 500mm when compared with the metre bar $L_A + L_B$ was found to be shorter by 0.0002mm. In comparing A with B it was found that A was 0.0004mm longer than B. Find the actual length of A and B. (05 Marks)

OR

- 2 a. Explain with necessary sketch the sine bar and sine principle. (07 Marks)
b. Explain with necessary diagram the use of sine bar to determine unknown angle. (08 Marks)
c. With necessary sketch explain the working principle of Vernier bevel protractor. (05 Marks)

Module-2

- 3 a. What is Fit? Explain with necessary sketches the different types of Fits. (10 Marks)
b. Differentiate between hole basis system and shaft basis system. (04 Marks)
c. Calculate the limits of tolerance and allowance for a 25mm shaft and hole pair designated by H_8d_9 . (06 Marks)

OR

- 4 a. Define Comparator. Give the classification of comparators. (04 Marks)
b. Explain the functional requirements of comparators. (04 Marks)
c. Explain with neat sketches the working of following comparators:
i) Johnsons Microkator ii) Solex pneumatic gauge. (12 Marks)

Module-3

- 5 a. What is Best size wire? Explain three wire method of measurement of effective diameter. (08 Marks)
b. With necessary sketch explain the measurement of gear tooth profile using gear tooth Vernier caliper. (08 Marks)
c. Define Addendum Dedendum, tooth profile and pitch circle. (04 Marks)

OR

- 6 a. With a neat sketch, explain the working Toolmaker's microscope. List the applications of TMM. (08 Marks)
b. List the major types of errors of spur gear. (06 Marks)
c. With a necessary sketch explain the measurement of major diameter of a screw thread using bench micrometer. (06 Marks)

Important Note : 1. On completing your answers, compulsorily 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.

Module-4

- 7 a. What is measurement with the help of block diagram explain the generalized measurement system. (10 Marks)
b. Explain with a neat sketch the working of Cathode Ray oscilloscope. (10 Marks)

OR

- 8 a. Explain the inherent problems present in mechanical modifying devices. (08 Marks)
b. Define error. List and explain different types of errors. (07 Marks)
c. List the elements of mechanical transducer. (05 Marks)

Module-5

- 9 a. List different methods of strain measurement. Explain with neat sketch the working of McLeod gauge. (12 Marks)
b. With a neat sketch, explain the working of proving ring. (08 Marks)

OR

- 10 a. What is thermocouple? State and explain the laws of thermocouple. (06 Marks)
b. Describe the construction and working of optical pyrometer. (08 Marks)
c. Explain with neat sketch the wheat stone bridge arrangement for strain measurement. (06 Marks)
