

CBCS SCHEME

USN

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

15MEB406/15ME46B

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021

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. Explain with a neat sketch Imperial standard yard. (06 Marks)
b. Distinguish between line standard and end standards. (04 Marks)
c. Three 200mm gauges to be calibrated are measured on a level comparator by wringing them together and then comparing them with a 600mm gauge. The 600mm gauge has an actual length of 600.0025mm, and the three gauges together have a combined length of 600.0035mm. When the three gauges are inter-compared, it is found the gauge A is longer than gauge B by 0.0020mm but shorter than gauge C by 0.001mm. Determine the length of each gauge. (06 Marks)

OR

- 2 a. Compute the slip gauge block combinations to build the following dimensions:
i) 35.04875 ii) 29.975 (06 Marks)
b. Explain the principle of sine bar. (04 Marks)
c. With a neat sketch, explain the working principle of an autocollimator. (06 Marks)

Module-2

- 3 a. Explain with a neat sketch, construction and working of sigma mechanical comparator. (08 Marks)
b. Explain briefly, the construction and working of LVDT as a comparator. (08 Marks)

OR

- 4 a. Explain the principles of interchangeability and selective assembly. (04 Marks)
b. Explain with schematic diagram:
i) Hole basis system ii) Shaft basis system (06 Marks)
c. Explain the Taylors principle of gauge design. (06 Marks)

Module-3

- 5 a. Derive an expression for measuring effective diameter of the screw thread using 2-wire method (08 Marks)
b. Explain with a sketch, how gear tooth thickness is measured by using constant chord method. (08 Marks)

OR

- 6 a. Explain gear roll tester for composite error with a neat sketch. (06 Marks)
b. Explain with neat sketches, coordinate measuring machine with different coordinate system. (06 Marks)
c. Construct and brief the working of a Lasher interferometer. (04 Marks)

Module-4

- 7 a. Define the following terms with reference to measurement:
i) Linearity ii) Sensitivity iii) Hysteresis (06 Marks)
b. With a diagram, distinguish between primary and secondary transducer. (06 Marks)
c. Mention advantages of electrical and mechanical transducers. (04 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.

OR

- 8 a. Explain with a neat sketch, the ballast circuit. (04 Marks)
b. Write a note on Input Circuitry. (04 Marks)
c. With a neat block diagram, explain the working principle of a CRO. (08 Marks)

Module-5

- 9 a. Sketch and explain the platform (multiple lever) balance method of measuring force. (08 Marks)
b. Explain the working of Hydraulic dynamometer with a neat sketch. (08 Marks)

OR

- 10 a. Write notes on the following:
i) Wheatstone bridge arrangement (08 Marks)
ii) Resistance Temperature Detector (RTD)
b. Explain the construction and working of optical pyrometer. (08 Marks)
