

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

Fourth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Mechanical Measurement 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. Explain the objectives of metrology. (06 Marks)
 b. With neat sketches, explain material standards. (08 Marks)
 c. Explain adjustable slip gauge. How is it different from regular slip gauge? (06 Marks)

OR

- 2 a. Explain the working principle of autocollimeter with a neat sketch. (08 Marks)
 b. Three 100 mm end bars are measured on a level comparator by first wringing them together and comparing with a 300 mm bar. There was an error of 0.03 mm and three bars together have total error of 0.064 mm less than the standard bar. Bar A is 0.02 mm longer than bar B and 0.025 mm longer than bar C. Determine the actual dimensions of all the end bars. (08 Marks)
 c. List the range and number of pieces available in a standard set of M112 slip gauge. (04 Marks)

Module-2

- 3 a. Discuss unilateral and bilateral tolerance. (04 Marks)
 b. With a neat sketch, explain hole basis and shaft basis system. (08 Marks)
 c. A shaft of 35 ± 0.004 mm is to be checked by GO-NOGO gauge. Design the required dimension for gauge. Also, draw the diametric representation. (08 Marks)

OR

- 4 a. Sketch and explain Johnson Mikrokator. (06 Marks)
 b. List the characteristics and applications of comparators. (08 Marks)
 c. Give the classification of comparators. Explain any one in detail. (06 Marks)

Module-3

- 5 a. Explain the method of measurement of pitch diameter. (10 Marks)
 b. With a neat sketch, explain the construction and working of toolmaker's microscope. (10 Marks)

OR

- 6 a. Sketch and explain the various types of standard tooth profile of a gear. (10 Marks)
 b. Write short notes on base tangent method. (05 Marks)
 c. Discuss the errors produced in manufacturing of gears. (05 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. Explain generalized measurement system with block diagram. (06 Marks)
b. Define the following terms:
i) Accuracy
ii) Precision
iii) Sensitivity
iv) Loading effect
v) Hysteresis. (10 Marks)
c. Explain the working principle of strain gauge. (04 Marks)

OR

- 8 a. With a neat sketch, explain the construction and working of cathode ray oscilloscope. (10 Marks)
b. Explain electrical intermediate modifying device. (05 Marks)
c. Write short notes on terminating devices. (05 Marks)

Module-5

- 9 a. List force measuring devices. Explain any one in detail. (08 Marks)
b. Explain the working of McLeod gauge. (06 Marks)
c. Briefly explain the types of dynameters. (06 Marks)

OR

- 10 a. Explain the laws of thermocouple. (08 Marks)
b. List the devices used for strain measurement. Explain any one in detail. (08 Marks)
c. Explain the method of preparation and mounting of strain gauges. (04 Marks)

* * * * *