

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

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020 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. List out the objectives of metrology. (06 Marks)
b. Mention the significance of measurement system. (06 Marks)
c. Describe with neat sketch,
i) International Prototype Meter
ii) Imperial Standard Yard. (08 Marks)

OR

- 2 a. Four End bars A, B, C and D are to be calibrated using a calibrated length bar of 400mm whose actual length is 399.9998mm. The bar B is longer than bar A by 0.0004mm, bar C is longer than bar A by 0.0003mm. while bar D is shorter than A by -0.0001 mm. The four gauges together have a combination length of 400.0002mm. Determine the corrected (actual) length of each end bar. (10 Marks)
b. Write short notes on : i) Line standard ii) End standard iii) Wavelength standard. (10 Marks)

Module-2

- 3 a. Describe the construction and working of LVDT. With a neat sketch. (10 Marks)
b. Explain with a neat sketch, Zeiss ultra optimeter. List out the advantages and disadvantages of optical comparator. (10 Marks)

OR

- 4 a. Give the combination of angle gauges to obtain the following angles :
i) $37^{\circ}16'42''$
ii) $102^{\circ}8'36''$. (06 Marks)
b. With a neat sketch, explain the method of measuring taper angles using sine center. (06 Marks)
c. Illustrate the principle of interferometry with neat sketches. (08 Marks)

Module-3

- 5 a. Mention any five mechanical and five electrical transducer elements. Also sketch and explain electronic transducers. (10 Marks)
b. Briefly explain inherent problems (any five) associated with mechanical intermediate modifying system. (10 Marks)

OR

- 6 a. Explain with a neat sketch, the working principle of CRO. (10 Marks)
b. What are X-Y plotters? With a block diagram, explain its working. (10 Marks)

Module-4

- 7 a. With a neat sketch, explain the working principle of prong brake dynamometer. List the limitations. (10 Marks)
- b. Explain with a neat sketch, the working principle of proving ring. (10 Marks)

OR

- 8 a. Write a note on preparation and mounting of strain gauges. (08 Marks)
- b. Explain with a neat sketch, of any one methods of strain, measurement. (08 Marks)
- c. Write short notes on Gauge factor. (04 Marks)

Module-5

- 9 a. Explain the following types of fits with a neat sketch and designations. (10 Marks)
- i) Clearance fit
 - ii) Interference fit
 - iii) Transition fit.
- b. Define the following :
- i) Nominal size
 - ii) Basic size
 - iii) Allowance
 - iv) Fit
 - v) Tolerance. (10 Marks)

OR

- 10 a. State the laws of thermocouples with neat sketch. (08 Marks)
- b. With a neat sketch, explain McLeod gauge. (08 Marks)
- c. Write short notes on optical pyrometer. (04 Marks)
