



CBCS SCHEME

17AU35

Third Semester B.E. Degree Examination, June/July 2019 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. With a neat sketch of a generalized measurement system explain the functions of each stage in measurement system. (08 Marks)
b. Define: Accuracy, Precision, Sensitivity, Repeatability, Calibration, Threshold. (06 Marks)
c. Classify errors that occur during measurement. Also, explain any one set of errors and possible remedies to overcome/minimize them. (06 Marks)

OR

- 2 a. State the objectives of metrology. (04 Marks)
b. With the help of neat sketches, define international Prototype Meter and Imperial Standard Yard. (08 Marks)
c. Explain: Primary standards, Secondary standards, Tertiary standards and Working standards. (08 Marks)

Module-2

- 3 a. Explain the characteristics of comparators. (05 Marks)
b. With the help of a neat sketch, explain the working of sigma comparator. (08 Marks)
c. With the help of a neat sketch explain the working of LVDT. (07 Marks)

OR

- 4 a. With the help of a neat sketch, explain the working of solex comparator. (07 Marks)
b. With the help of a neat sketch, explain the procedure to measure the angle of a HEAVY component using sine bar. (07 Marks)
c. How sine centre is different from sine bar? Explain with the help of sketch. (06 Marks)

Module-3

- 5 a. What is the function of a transducer? With the help of an example, explain primary transducer and secondary transducer. (05 Marks)
b. What are the advantages of electrical type of transducers compared to mechanical transducers? (05 Marks)
c. With the help of sketches, explain any two types of mechanical transducer and any two types of electrical transducer. (10 Marks)

OR

- 6 a. List the inherent problems in mechanical modifying devices. (06 Marks)
b. With the help of a neat sketch, explain the use of clinometer. (07 Marks)
c. With the help of a neat sketch, explain the working of autocollimator. (07 Marks)

Module-4

- 7 a. With the help of a neat sketch, explain how force is measured using analytical balance. (06 Marks)
b. How do you measure force using a proving ring? Explain. (06 Marks)
c. With the help of sketch, explain the measurement of torque using prony brake dynamometer. (08 Marks)

OR

- 8 a. With the help of a neat sketch, explain the working principle of hydraulic dynamometer. (08 Marks)
b. With a neat sketch, explain the working of Cathode Ray Oscilloscope. (07 Marks)
c. Sketch X-Y plotter and explain how it is used as an output device. (05 Marks)

Module-5

- 9 a. Explain the principles of interchangeability and selective assembly. (04 Marks)
b. Compare hole basis system and shaft basis system. (04 Marks)
c. Determine the type of fit of 55H7/f8. Diameter 55mm lies in the diameter step of 50-65. The standard tolerance for H7 hole is 16i. The standard tolerance for f8 shaft is 25i. The fundamental deviation for f8 shaft is $-5.5D^{0.41}$. (12 Marks)

OR

- 10 a. Explain the measurement of pressure using Bridgeman gauge. (07 Marks)
b. State and explain the laws of thermocouples. (06 Marks)
c. Explain the working principle of optical pyrometer. (07 Marks)
