

GBCS SCHEME

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15ME46B/15MEB406

Fourth Semester B.E. Degree Examination, July/August 2021 Mechanical Measurements and Metrology

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

1.
 - a. Define metrology. State the objectives of metrology. (08 Marks)
 - b. Explain line standards and end standard with suitable examples. (04 Marks)
 - c. Calculate the dimensions using M-87 set 49.3825 mm. (04 Marks)
2.
 - a. Explain with neat sketch "Imperial Standard Yard". (05 Marks)
 - b. Four end bars of basic length 125 mm are to be calibrated using standard bar of 500 mm whose actual length is 499.9991 mm. It was also found that length of bars B, C and D in comparison with A are +0.0001 mm, +0.0005 mm and -0.0002 mm respectively and the length of all the four bars put together in comparison with the standard bar is +0.0003 mm longer. Find the actual length of each end bars. (05 Marks)
 - c. Distinguish between sine bar and sine centre with suitable sketches. (06 Marks)
3.
 - a. Explain any two types of fits. (06 Marks)
 - b. Distinguish between hole basis and shaft basis system of fits. (05 Marks)
 - c. List and explain gauge materials used for making gauges. (05 Marks)
4.
 - a. Classify different types of comparators. (05 Marks)
 - b. Explain with neat sketch the working of LVDT. (06 Marks)
 - c. Explain with neat sketch working of Solex Pneumatic Comparator. (05 Marks)
5.
 - a. Explain with sketch for measurement of effective diameter by three wire method. (08 Marks)
 - b. Explain with neat sketch tool maker's microscope. (08 Marks)
6.
 - a. Describe with neat sketch gear roll tester for composite error (Parkinson gear tester). (08 Marks)
 - b. Define best wire size. Derive an expression for best size wire. (08 Marks)
7.
 - a. Define measurement. Describe with suitable example, generalized measurement system. (08 Marks)
 - b. Define the following terms: (i) Accuracy (ii) Precision (iii) Calibration (03 Marks)
 - c. List the advantages of electrical transducer elements over mechanical transducer elements. (05 Marks)
8.
 - a. Describe in detail a ballast circuit. (06 Marks)
 - b. List the materials and uses of piezoelectric crystals used in piezoelectric transducer. (04 Marks)
 - c. Describe with neat sketch of Cathode-Ray Oscilloscope (CRO). (06 Marks)
9.
 - a. Explain with neat sketch hydraulic dynamometers. (08 Marks)
 - b. Explain with neat sketch pirani thermal conductivity gauge. (08 Marks)
10.
 - a. Describe with neat sketch the working of optical pyrometer. (08 Marks)
 - b. Describe with neat sketch of a simple resistance bridge arrangement for strain measurement. (08 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.