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10MR36

Third Semester B.E. Degree Examination, June/July 2015
Mechanical Measurements and Metrology

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define line standard and end standard. State the objectives of metrology. **(06 Marks)**

b. Explain imperial standard yard with sketch. **(04 Marks)**

c. Briefly explain different sub divisions of standards of measurements. **(04 Marks)**

d. Build the following dimensions:

i) 49.3825 using M-87 set of slip gauges.

ii) 35.4875mm using M-112 set of slip gauges. **(06 Marks)**

2 a. With neat sketches, explain the hole based system of limits and fits. **(06 Marks)**

b. Explain with sketches clearance fit, interference fit, and transition fit. **(06 Marks)**

c. Determine the dimensions and tolerances of shaft and hole having size of $30H_7/h_8$ fit. Also determine the allowance (i.e., minimum and maximum clearance). **(08 Marks)**

3 a. Explain with neat sketch the constraction and working of an LVDT. **(07 Marks)**

b. What are the advantages and disadvantages of mechanical and electronic comparators? **(06 Marks)**

c. With the help of sketch, explain solex pneumatic comparator and its advantages. **(07 Marks)**

4 a. Explain how the straightness can be measured by using autocollimator. **(08 Marks)**

b. Explain the 3 wire method of measuring the effective diameter of screw thread. **(08 Marks)**

c. Briefly explain the working of tool makers microscope. **(04 Marks)**

PART – B

5 a. Explain the generalized measurement system with block diagram. **(06 Marks)**

b. Define the following terms: i) Accuracy ii) Precision iii) Callibration iv) Hysteresis. **(08 Marks)**

c. Explain with a neat sketch capacitive transducer used to measure the change in distance. **(06 Marks)**

6 a. What are the requirement of an intermediate modifying derive? Explain the problems associated with mechanical system. **(08 Marks)**

b. With a neat sketch, explain Vaccum tube amplifiers. **(05 Marks)**

c. Explain the concept of telementry with block diagram. **(07 Marks)**

7 a. List the instruments used for measurement of low pressure. Explain the McLeod gage with sketch. **(10 Marks)**

b. Sketch and explain mechanical dynamometer (Prony brake). **(06 Marks)**

c. What are the advantages of Hydraulic dynamometers over mechanical brakes? **(04 Marks)**

8 a. What are the advantages and disadvantages of thermocouple? **(04 Marks)**

b. Explain optical pyrometer with a neat sketch. **(07 Marks)**

c. With a neat sketch, explain mechanical strain gauge. **(06 Marks)**

d. Write a note on bonding materials used on strain gauge. **(03 Marks)**

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