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10MEB402/ME42B

Fourth Semester B.E. Degree Examination, Aug./Sept.2020
Mechanical Measurements and Metrology

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define the term metrology and states it objectives. **(06 Marks)**

b. What is the Role of Standards? Discuss the following standards of measurements:
i) Line standards
ii) Wave length standards
iii) End standards. **(10 Marks)**

c. Using M112 slip gauge set, build the following dimensions.
i) 49.3825 ii) 87.3215 **(04 Marks)**

2 a. What is the necessary to give a tolerance on an Engineering Dimensions? Explain unilateral tolerance and bilateral tolerances. **(06 Marks)**

b. Explain the terms:
i) Interchangability
ii) Selective Assembly. **(06 Marks)**

c. Determine the tolerances to be provided for a hole and shafting system has a fit designated by $25H_8/d_9$. Given the following data:
i) 25mm falls in the diameter steps of 18-30mm
ii) Value of tolerance limit $i = 0.45 (D)^{1/3} + 0.001D$
iii) Fundamental deviation for hole 'H' = 0
iv) Fundamental deviation for "d'shaft = $-16D^{0.44}$
v) IT8 = 25i and IT9 = 40i. **(08 Marks)**

3 a. What is a comparator? Give the detailed classification of comparator's. **(06 Marks)**

b. Explain with a neat sketch the construction and working of Linear Variable Differential Transformer (L.V.D.T.) **(07 Marks)**

c. With a neat sketch explain the principle and working of sine bar. **(07 Marks)**

4 a. Explain the principles of interferometry with sketches. **(06 Marks)**

b. Describe the 3-wire method of measuring effective diameter of threads. **(08 Marks)**

c. Explain the principle of Autocollimator with sketch. **(06 Marks)**

PART – B

5 a. Define measurement. Explain the generalized measuring system with examples. **(06 Marks)**

b. What is error? Explain error's in measurement. **(06 Marks)**

c. With a neat sketch explain (photo electric) transducer. **(08 Marks)**

6 a. What are intermediate modifying devices? What are its primary functions? **(06 Marks)**

b. Explain sketch/circuit diagram
i) Ballast circuit
ii) Electronic amplifiers. **(08 Marks)**

c. Write a note on X-Y-Plotters. **(06 Marks)**

7 a. With a neat sketch, explain working of prony brake dynamometer. (07 Marks)
b. Explain with a neat sketch working of Mcleod gauge to measure pressure. (07 Marks)
c. Explain how a Bridgeman gauge is used to measure pressure. What are its limitations? (06 Marks)

8 a. What is a thermocouple? Explain the principle on which it works. (07 Marks)
b. What is pyrometer? Explain with sketch working of optical pyrometer. (07 Marks)
c. What are electrical strain gauges? How they are classified? (06 Marks)

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