CBCS SCHEME

USN | | | | | | | | | |

17AE36

Third Semester B.E. Degree Examination, Aug./Sept.2020
Measurement 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 explain International Prototype meter. **(06 Marks)**

b. Build the length 49.3115mm using M112 set of slip gauge. **(04 Marks)**

c. A calibrated end bar has an actual length of 1000.0003mm. It is used in calibration of two bars A and B, each having a basic length of 500mm. When compared with a meter bar $L_A + L_B$ was found to be shorter by 0.0002mm. In comparing A and B it was found that A was 0.0004mm longer than B. Find the actual length of A and B. **(10 Marks)**

OR

2 a. Define Metrology. What are the objectives of metrology from industrial point of view? **(06 Marks)**

b. Discuss the necessity of standards in modern world. **(06 Marks)**

c. With neat sketches explain wringing phenomena. **(08 Marks)**

Module-2

3 a. Explain hole and shaft based system. Which is preferred? **(05 Marks)**

b. Discuss about types of fits. **(05 Marks)**

c. Determine the tolerance on the hole and shaft for a precision running fit designed by $50H_7g_6$ Given: 50mm lies between 30-50mm, FD of "g" shaft = $-2.5D^{0.34}$, IT7 = 16i and IT6 = 10i. State the actual limit of hole and shaft and also find maximum and minimum clearances. **(10 Marks)**

OR

4 a. Discuss about third system of gauge makers tolerance. **(08 Marks)**

b. Discuss the concepts of interchangeability and selective assembly. Which is advantageous? **(04 Marks)**

c. Discuss on the gauges used for Hole and Shaft. **(08 Marks)**

Module-3

5 a. With a neat figure explain working of Johansson Mikrokator. **(08 Marks)**

b. Discuss the construction and working of Zeiss Ultra-Optimeter. **(08 Marks)**

c. What are advantages of optical comparator over mechanical comparator? **(04 Marks)**

OR

6 a. Derive an expression for best size wire. **(10 Marks)**

b. Built the required angle using angle gauge 33° 16′ 42″. **(04 Marks)**

c. Discuss the principle behind pneumatic comparator. **(06 Marks)**

Module-4

7 a. With a block diagram discuss generalized measurement system. **(08 Marks)**

b. Define

(i) Sensitivity (ii) Hysteresis (iii) Accuracy

(iv) Precision (v) Repeatability (vi) Reproducibility **(12 Marks)**

OR

8 a. Discuss any two types of capacitive transducers. **(08 Marks)**

b. What is Piezo-electric Transducers? **(06 Marks)**

c. With a neat figure discuss electrokinetic transducers. **(06 Marks)**

Module-5

9 a. Derive the expression for sensitivity "S" of analytical balancing. **(10 Marks)**

b. Discuss the two laws of thermocouples. **(10 Marks)**

OR

10 a. With a figure discuss the working of McLeod gauge. **(10 Marks)**

b. What is optical pyrometer? With a figure explain the construction and working of optical pyrometer. **(10 Marks)**

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