USN | | | | | | | | | | | **18AU35**

Third Semester B.E. Degree Examination, Aug./Sept. 2020
Mechanical Measurements & Metrology

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. What is Metrology? State and explain the objectives of metrology. **(10 Marks)**
   b. Define the following terms used with reference to measurement:
   (i) Accuracy (ii) Hysteresis (iii) Repeatability (iv) Threshold. **(10 Marks)**

OR

2 a. Discuss the following standards of measurements:
   (i)   Line standard **(03 Marks)**
   (ii)   Wave length standard **(03 Marks)**
   (iii) End standard **(04 Marks)**
   b. What is Error? Explain the error in measuring instruments. **(10 Marks)**

Module-2

3 a. What is a comparator? Give the differences between a comparators and a measuring instrument. **(10 Marks)**
   b. Sketch and explain the working of a sigma comparator. **(10 Marks)**

OR

4 a. Explain with a neat sketch, the working of a "Solex Pneumatic Comparator". **(10 Marks)**
   b. Select the size of angle gauges required to build. (i) 57°34′9″ (ii) 35°32′36″ **(10 Marks)**

Module-3

5 a. Explain briefly the various types of Mechanical transducer elements. **(10 Marks)**
   b. With sketches, explain Piezo-Electric effect and Modes of operation of piezoelectric crystals. **(10 Marks)**

OR

6 a. With a sketch explain the construction and important parts of a CRO. **(10 Marks)**
   b. What are X-Y plotters? With a block diagram, explain its working. **(10 Marks)**

Module-4

7 a. Explain with a sketch working of proving ring. **(10 Marks)**
   b. Explain hydraulic dynamometr with a neat sketch. **(10 Marks)**

OR

8 a. What are the steps to be token in the preparation of the specimen and mounting of strain gauges? **(10 Marks)**
   b. Explain the following terms:
   (i) Force (ii) Torque (iii) Strain (iv) Gauge factor **(10 Marks)**

Module-5

9 a. Explain the following showing the designation of each.
   (i) Clearance fit (ii) Interfernce fit (iii) Transition fit. **(10 Marks)**
   b. Define the following : (i) Nominal size (ii) Basic size (iii) Allowance (iv) Fit (v) Tolerance **(10 Marks)**

OR

10 a. Describe with a neat sketch McLeod vaccum gauge. **(10 Marks)**
   b. What is a thermocouple? Explain the laws of thermocouple. **(10 Marks)**

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