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15MEB406/15ME46B

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021
Mechanical Measurements and Metrology

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1   a. Explain with a neat sketch Imperial standard yard. **(06 Marks)**
    b. Distinguish between line standard and end standards. **(04 Marks)**
    c. Three 200mm gauges to be calibrated are measured on a level comparator by wringing them together and then comparing them with a 600mm gauge. The 600mm gauge has an actual length of 600.0025mm, and the three gauges together have a combined length of 600.0035mm. When the three gauges are inter-compared, it is found the gauge A is longer than gauge B by 0.0020mm but shorter then gauge C by 0.001mm. Determine the length of each gauge. **(06 Marks)**

OR

2   a. Compute the slip gauge block combinations to build the following dimensions:
        i) 35.04875   ii) 29.975 **(06 Marks)**
    b. Explain the principle of sine bar. **(04 Marks)**
    c. With a neat sketch, explain the working principle of an autocollimator. **(06 Marks)**

Module-2

3   a. Explain with a neat sketch, construction and working of sigma mechanical comparator. **(08 Marks)**
    b. Explain briefly, the construction and working of LVDT as a comparator. **(08 Marks)**

OR

4   a. Explain the principles of interchangeability and selective assembly. **(04 Marks)**
    b. Explain with schematic diagram:
        i) Hole basis system   ii) Shaft basis system **(06 Marks)**
    c. Explain the Taylors principle of gauge design. **(06 Marks)**

Module-3

5   a. Derive an expression for measuring effective diameter of the screw thread using 2-wire method **(08 Marks)**
    b. Explain with a sketch, how gear tooth thickness is measured by using constant chord method. **(08 Marks)**

OR

6   a. Explain gear roll tester for composite error with a neat sketch. **(06 Marks)**
    b. Explain with neat sketches, coordinate measuring machine with different coordinate system. **(06 Marks)**
    c. Construct and brief the working of a Lasher interferometer. **(04 Marks)**

Module-4

7   a. Define the following terms with reference to measurement:
        i) Linearity   ii) Sensitivity   iii) Hysteresis **(06 Marks)**
    b. With a diagram, distinguish between primary and secondary transducer. **(06 Marks)**
    c. Mention advantages of electrical and mechanical transducers. **(04 Marks)**

OR

8	a.	Explain with a neat sketch, the ballast circuit.	**(04 Marks)**
	b.	Write a note on Input Circuitry.	**(04 Marks)**
	c.	With a neat block diagram, explain the working principle of a CRO.	**(08 Marks)**

Module-5

9	a.	Sketch and explain the platform (multiple lever) balance method of measuring force.	
			(08 Marks)
	b.	Explain the working of Hydraulic dynamometer with a neat sketch.	**(08 Marks)**

OR

10	a.	Write notes on the following: i) Wheatstone bridge arrangement ii) Resistance Temperature Detector (RTD)	**(08 Marks)**
	b.	Explain the construction and working of optical pyrometer.	**(08 Marks)**

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