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10ME42B/AU42B/TL42

Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Mechanical Measurements and Metrology

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the following with necessary schematic diagrams:
   i) International prototype meter.
   ii) Imperial standard yard. **(12 Marks)**

   b. Illustrate the process of slip gauge wringing. **(06 Marks)**

   c. What are protector blocks? **(02 Marks)**

2 a. Discuss the following with necessary diagrams:
   i) Compound tolerance
   ii) Accumulation of tolerance. **(08 Marks)**

   b. Illustrate the following types of gauges:
   i) Adjustable snap gauge.
   ii) Double ended solid snap gauge.
   iii) Ring gauge. **(12 Marks)**

3 a. Discuss the construction and working of a pneumatic comparator with a schematic diagram. **(11 Marks)**

   b. List the instruments used for angular measurement. **(03 Marks)**

   c. Select the angle gauges out of the following 13 gauges to build an angle of 57° 34′ 15″ and sketch the combination:
   I series: 1°, 3°, 9°, 27° and 41°
   II series : 1′, 3′, 9′, and 27′
   III series : 3″, 6″, 18″, and 30″. **(06 Marks)**

4 a. Illustrate the 2 methods of measuring minor diameter of internal threads. **(10 Marks)**

   b. List the different methods of measuring the gear tooth thickness. **(02 Marks)**

   c. Illustrate the terms used in connection with gear tooth. **(08 Marks)**

PART – B

5 a. With a schematic diagram, discuss generalized measurement system. **(10 Marks)**

   b. What is calibration? Also, explain the following terms:
   i) Single point calibration
   ii) Multipoint calibration
   iii) Dynamic calibration
   iv) Static calibration. **(10 Marks)**

6 a. Illustrate a ballast circuit. Also, draw the curves showing relation between input and output for a ballast circuit. **(10 Marks)**

b. Illustrate the cathode ray tube schematically and explain its working. **(10 Marks)**

7 a. Illustrate the ordinary equal-arm beam balance. Also, explain the method of symmetry used for checking the true null of the above balance. **(10 Marks)**

b. Illustrate the Pirani thermal conductivity gage. Also, explain the phenomenon on which this gage is based. **(10 Marks)**

8 a. Illustrate a simple flat strip configuration of a wire RTD. Represent mathematically, the temperature – resistance relation of an RTD for most metals. Also, mention the properties desirable in a material used for RTD elements. **(12 Marks)**

b. Illustrate a simple resistance-bridge arrangement for strain measurement which uses a dummy gage for temperature compensation. **(08 Marks)**

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