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15MEB406/15ME46B

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Mechanical Measurements and Metrology

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. State the objectives of Metrology. **(04 Marks)**
   b. Explain with a neat sketch International Prototype meter. **(06 Marks)**
   c. Using M112 set of slip gauges, build the following dimensions :
      i) 48.3275   ii) 68.208. **(06 Marks)**

OR

2 a. Four length bars A, B, C & D of approximately 250mm each are to be calibrated with standard calibrated metre bar which is actually 0.0008mm less than a metre. It is also found that bar B is 0.0002mm longer than bar 'A' bar 'C' is 0.0004mm longer than 'A' and bar 'D' is 0.0001mm shorter than bar 'A'. The length of all four bars put together is 0.0003mm longer than the calibrated standard metre. Determine the actual dimension of each bar. **(10 Marks)**
   b. Explain with a neat sketch the method of measuring taper angles using sine centre. **(06 Marks)**

Module-2

3 a. Differentiate : i) Clearance fit and Interference fit   ii) Unilateral and Bilateral tolerance. **(08 Marks)**
   b. Explain Hole basis system and Shaft basis system. **(08 Marks)**

OR

4 a. Illustrate with a neat sketch, the working of a sigma comparator. **(08 Marks)**
   b. With a neat sketch, explain the construction and principle of Solex Pneumatic Comparator. **(08 Marks)**

Module-3

5 a. Explain the two wire method to find the effective diameter of screw thread. **(06 Marks)**
   b. With a sketch, explain the construction of a tool maker's microscope. What are its applications? **(08 Marks)**
   c. What is Best Wire Size? **(02 Marks)**

OR

6 a. Sketch and explain co-ordinate measuring machine. **(06 Marks)**
   b. What are Tactile sensors? Explain different types of tactile sensors. **(06 Marks)**
   c. Explain the principle of Inferometry. **(04 Marks)**

Module-4

7 a. Explain the working of generalized measurement system with block diagram taking the example. **(06 Marks)**
   b. Define the following terms, with reference to measuring systems :
      i) Threshold   ii) Hysteresis. **(04 Marks)**

c. Distinguish between :
   i) Primary & Secondary transducer   ii) Active & Passive transducer. (06 Marks)

OR

8 a. State and explain any four Inherent problems associated in mechanical systems. (08 Marks)
   b. State any four terminating devices. Explain any two. (08 Marks)

Module-5

9 a. With a neat sketch, describe the Bridgeman gauge used for pressure measurement. (08 Marks)
   b. How are dynamometers classified? Explain with a neat sketch, Prony brake dynamometer.
      (08 Marks)

OR

10 a. Explain the working principle of radiation pyrometer. (06 Marks)
   b. Illustrate the working of Electrical resistance strain gauge. (04 Marks)
   c. Briefly explain the laws of Thermocouple. (06 Marks)

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