CBCS SCHEME

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17AE36

Third Semester B.E. Degree Examination, June/July 2019
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. Define standard. List and explain subdivision of standards. **(06 Marks)**

b. Describe with a neat sketch. Imperial standard yard. **(07 Marks)**

c. Explain the wavelength standard. List the advantages of using wavelength standard. **(07 Marks)**

OR

2 a. Explain the wringing phenomena of slip gauges and breaking of a stack of slip gauges. **(08 Marks)**

b. 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 bar 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 dimensions of each bar. **(08 Marks)**

c. List the slips to be wrung together to produce an overall dimension of 92.357mm using two protection slips of 2.500mm size. Show the slip gauges combination. **(04 Marks)**

Module-2

3 a. Explain interchangeability and selective assembly with suitable examples. **(08 Marks)**

b. Discuss positional tolerances. **(06 Marks)**

c. Explain hole basis system and shaft basis system. **(06 Marks)**

OR

4 a. Determine the dimensions of the shaft and hole for a fit 30 H_8d_{10} and sketch the fit, given: diameter 30 falls in the diameter range 18-30, upper deviation for "d" shaft is $-16D^{0.44}$, $i = 0.45\ D^{1/3} + 0.001D$. Tolerance for IT8 = 25i. Tolerance for IT10 = 64i. **(06 Marks)**

b. Sketch and explain ring and snap gauges. **(08 Marks)**

c. What are the essential considerations in selection of materials for gauges? What are the common materials used for gauges? **(06 Marks)**

Module-3

5 a. With a neat sketch, explain the working and principle of Johnson Mikrokator. **(08 Marks)**

b. List the advantages and disadvantages of optical comparators. **(04 Marks)**

c. Explain with a sketch, the working of a 'Solex pneumatic comparators'. **(08 Marks)**

OR

6 a. Explain the principle and working of optical bevel protractors with a neat sketch. **(06 Marks)**

b. Select the sizes of angle gauges to obtain the angle 57°34'9". **(04 Marks)**

c. Describe the 3-wire method of measuring effective diameter of threads. **(10 Marks)**

Module-4

7 a. What is measurement? What is the significance of measurement system? **(06 Marks)**

b. Explain with sketches Hysteresis, sensitivity and repeatability. **(09 Marks)**

c. Explain loading effect with respect to a measuring instrument. **(05 Marks)**

OR

8 a. Define transfer efficiency of a transducer. Explain with an example primary and secondary transducers. **(08 Marks)**

b. Explain with sketch the construction and working of an electronic transducer element. **(08 Marks)**

c. List the advantages of electrical transducer elements. **(04 Marks)**

Module-5

9 a. Explain hydraulic dynamometer with a neat sketch. **(10 Marks)**

b. Explain with a neat sketch Pirani gauge. **(10 Marks)**

OR

10 a. State and explain the laws of thermocouple. **(10 Marks)**

b. Describe the construction and working of optical pyrometer with sketch. **(10 Marks)**

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