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E. Societ a N. CBCS SCHEME

1-1114001

USN | | | RARY | | | | | | 15ME46B/15MEB406

Fount' me ter B.E. Degree Examination, June/July 2019

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. Describe with a suitable sketch Imperial Standard Yard. **(06 Marks)**

b. Explain with a neat sketch, the use of sine bar for measurement of known angle. **(06 Marks)**

c. Build up the slip gauge combination using the M1 12 set for the following:
(i) 52.9875 mm (ii) 35.357 mm

M 112 SET

Range	Steps	Pieces
1.0005	-	1
1.001 to 1.009	0.001	9
1.01 to 1.49	0.01	49
0.5 to 24.5	0.5	49
25, 50, 75, 100	25.0	4

(04 Marks)

OR

2 a. Explain briefly the wringing phenomenondn slip gauges. **(06 Marks)**

b. List some of the advantages of wavelength standards. **(04 Marks)**

c. Explain the principle of an autocollimator and list some of its applications. **(06 Marks)**

Module-2

3 a. Explain the different types of fits with suitable sketches. **(06 Marks)**

b. Define a comparator. With a neat sketch explain Solex pneumatic gauge. **(06 Marks)**

c. Determine the dimensions of hole and shaft assembly designated as 100 H8e $_9$, fit given:
100 mm lies in the diameter step of 80 and 120 mm
i = 0.45 (D)" + 0.001 D, (D in mm, i value in microns)
IT8 = 25i
1T9 = 40i
Fundamental deviation of 'e' shaft is given by —5.5D" in microns. Also determine the maximum and minimum clearances. **(04 Marks)**

OR

4 a. Distinguish between the following:
i) Hole Basis System and Shaft basis system
ii) Geometric Tolerances and Positional tolerances **(08 Marks)**

b. State Taylor's principle on limit gauges. **(02 Marks)**

c. Sketch and explain Johannson's Mikrokator. **(06 Marks)**

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Module-3

5 a. With a neat sketch explain the Three-Wire method for measurement of effective diameter. **(05 Marks)**

b. With a neat sketch, explain Tool Maker's microscope. **(06 Marks)**

c. Explain with a neat sketch the use of Gear Tooth Vernier Calipers for the measurement of Chordal thickness of a spur gear. **(05 Marks)**

OR

6 a. Explain any one type of laser Interferometer. List some of the advantages of lasers. **(08 Marks)**

b. With a neat sketch, explain CMM. List some of the applications of CMM. **(08 Marks)**

Module-4

7 a. Describe the generalized measurement system with a block diagram. **(06 Marks)**

b. Define the following terms:
(i) Accuracy (ii) Precision (iii) Hysteresis
(iv) Sensitivity (v) Loading effects **(05 Marks)**

c. Sketch and explain any one type of electrical transducer. **(05 Marks')**

OR

8 a. Explain the inherent problems present in mechanical modifying system. **(05 Marks)**

b. Describe the Cathode-Ray-Oscilloscope with a neat sketch. **(07 Marks)**

c. With a neat sketch, explain any one type of capacitive transducer. **(04 Marks)**

Module-5

9 a. Explain with a neat sketch, McLeod gauge for measurement of low pressure. **(08 Marks)**

b. With a neat sketch, explain the working principle of Prony Brake Dynamometer. **(08 Marks)**

OR

10 a. State the laws of thermocouples. **(04 Marks)**

b. Explain the construction and working principle of optical pyrometer. **(08 Marks)**

c. Write a brief note on Gauge factor with respect to the strain gauges. **(04 Marks)**

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