CBCS SCHEME

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21AU42

Fourth Semester B.E. Degree Examination, June/July 2024
Mechanical 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. Explain generalized measurement system using a block diagram. **(10 Marks)**

b. Discuss the following definitions
i) Repeatability ii) Accuracy iii) Threshold iv) Linearity v) Calibration. **(10 Marks)**

OR

2 a. Discuss the Piezo-electric Transducers with suitable figure. **(10 Marks)**

b. Illustrate the working of mechanical transducers with suitable figure. **(10 Marks)**

Module-2

3 a. Discuss the objectives of metrology. **(06 Marks)**

b. With a relevant figure, explain the Imperial Standard Yard. **(08 Marks)**

c. Four length bars A, B, C and D each having a basic length 125mm are to be calibrated using a calibrated length bar of 500mm basic length. The 500mm bar has an actual length of 499.999/mm. Also it was found that $L_B = L_A + 0.0001$mm, $L_C = L_A + 0.0005$mm, $L_D = L_A - 0.0002$mm and $L_A + L_B + L_C + L_D = L + 0.0003$mm. Determine L_A, L_B, L_C and L_D. **(06 Marks)**

OR

4 a. With suitable figure, explain the system of Fits. **(10 Marks)**

b. Discus the principle of inter changeability and selective assembly. **(10 Marks)**

Module-3

5 a. With a neat sketch, explain the principle of mechanical optical comparator. **(10 Marks)**

b. Discuss the principle of LVDT with suitable figure. **(10 Marks)**

OR

6 a. Illustrate the construction of Vernier Bevel Protractor with suitable figure. **(10 Marks)**

b. Describe the principle of Inter Ferometry with relevant figure. **(10 Marks)**

Module-4

7 a. Discuss the working of Hydraulic dynamometer with relevant sketch. **(10 Marks)**

b. Discuss the principle of analytical balance with suitable figure. **(10 Marks)**

OR

8 a. Discuss the preparation and mounting of strain gauges. **(10 Marks)**

b. Describe the working of Tuckerman Optical Extensometer with suitable figure. **(10 Marks)**

Module-5

9 a. With a neat sketch, explain the working of McLeod Gauge. **(10 Marks)**

b. With a neat sketch explain the principle of Pirani Thermal conductivity gauge. **(10 Marks)**

OR

10 a. Discuss laws of Thermocouples with relevant sketches. **(10 Marks)**

b. With a relevant figure describe the working of an optical pyrometer. **(10 Marks)**

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