

**CERTIFICATE IN CONDITION
MONITORING
(CCOMO)**

Term-End Examination

June, 2023

**MET-001 : METROLOGY, INSTRUMENTATION
AND TRIBOLOGY**

Time : 3 Hours

Maximum Marks : 70

Note : (i) *Attempt any **seven** questions.*

(ii) *All questions carry equal marks.*

1. (a) What are the standards of measurement and their classification ? 5
(b) Explain hole basis and shaft basis system of fit with the help of neat diagrams. 5
2. The resistance of a certain size of wire is given by : 10

$$R = R_0 [1 + \alpha (T - 20)]$$

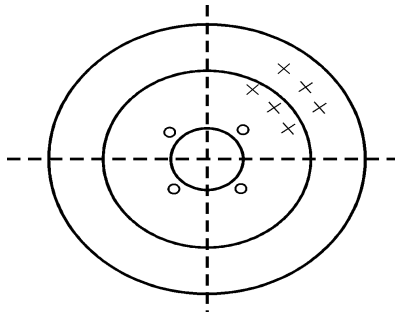
where $R_0 = 6 \Omega \pm 0.3\%$ is the resistance at 20°C

$\alpha = 0.004^\circ\text{C} \pm 1\%$ is the temperature coefficient of resistance

$T = 30 \pm 1^\circ\text{C}$ is the temperature of the wire.

Find its uncertainty.

3. (a) What are the differences between standard gauges and limit gauges ? 4
- (b) Sketch and describe the following : 6
- (i) Taper gauges
- (ii) Snap gauges
4. Define the following terms : $2 \times 5 = 10$
- (i) Arithmetic Mean
- (ii) Median
- (iii) Mode
- (iv) Geometric Mean
- (v) Harmonic Mean
5. Describe the working principle of an autocollimator with suitable sketches. 10
6. (a) What is error in measurement ? Classify errors and describe each class. 5
- (b) Distinguish between accuracy and precision, by giving example. Two shooters A and B shoot at target and marks are shown by (o) and (x) for A and B. Which is accurate and which is precise ? 5



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7. (a) What is a protractor ? Sketch a universal protractor and describe its functioning. 5
- (b) What is a strain gauge ? What does it measure and what is gauge factor ? What materials are used to make strain gauge ? 5
8. (a) How do you obtain increased size of image from a projector ? 5
- (b) What are the engineering applications of a projector ? 5
9. (a) Define Metrology. What is the necessity and importance of metrology ? 5
- (b) What are the systems of specifying tolerances ? Explain. 5
10. Discuss in detail the processes of : 5+5
- (a) Electroplating
- (b) Galvanizing

MET-001