

CT Inst. of E

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IE/ME) (Sem.-5th)

MECHANICAL MEASUREMENT AND METROLOGY

Subject Code : ME-307

Paper ID : [A0817]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION-B contains **FIVE** questions carrying **FIVE** marks each and students has to attempt any **FOUR** questions.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students has to attempt any **TWO** questions.

SECTION-A**I. Answer briefly :**

- a. Differentiate primary, secondary and tertiary standards.
- b. Define threshold and resolution clearly differentiating the meaning of both the terms.
- c. Define average surface roughness. What are various systems of measurement of surface roughness?
- d. Define gauge factor. What is the significance of gauge factor for strain gauges?
- e. What is the function of hot wire anemometer? Explain its principle and main applications.
- f. How internal and external threads are measured? What is the principle on which this measurement is based?
- g. Explain the difference between optical and total radiation pyrometer.
- h. What is the function of proving ring? Write its various industrial applications.

- i. How straightness and flatness is measured?
- j. Explain the function of absorption/transmission dynamometers.

SECTION-B

2. What are systematic and random errors? How to minimize them? What are various precautions for minimizing these errors?
3. Classify various comparators. Compare any two types. State at least one advantage and limitation in reference to each.
4. What is temperature compensation? How is it achieved? Explain with the help of neat sketch.
5. What is flow visualization? What is its significance? Briefly explain various flow visualization techniques.
6. How is torque on rotating shafts measured? Explain the principle of the device used for this measurement.

SECTION-C

7. What are basic and functional elements of a measurement system? Explain in detail the significance of these elements for a measurement system. Identify various elements for a rudimentary pressure measurement system. Draw a block diagram.
8. Explain principle, constructional features, and working of a flow meter with the help of a sketch. How is it calibrated? Explain in detail major advantages and limitations of flow meter relative to other types.
9. (a) Make a list of gage for measurement of length. Explain principle and working of McLeod Gage.
(b) A McLeod gage is available which has a vertical capillary diameter of 1.5 mm. Calculate the range of 40 micrometer of Mercury.