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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Ind. Engg. &amp; Mgt.) (Spl. in TQM) PT (Sem.-3)

**MEASUREMENTS AND METROLOGY**

Subject Code : IEM-303

M.Code : 61013

Time : 3 Hrs.

Max. Marks : 40

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt All EIGHT questions from SECTION-A carrying TWO marks each.
2. Attempt any SIX questions out of EIGHT from SECTION-B carrying FOUR marks each.

**SECTION-A****Q1 Answer briefly :**

- a. What are systematic errors and precision errors?
- b. What are slip gauges? What is wringing?
- c. What do you understand by roundness and circularity?
- d. What is autocollimator?
- e. What is venturimeter? Where is it used?
- f. Write name of instruments to measure :
  - (i) Smoke density
  - (ii) Humidity
  - (iii) pH value
  - (iv) Film thickness
- g. What is Tylor's principle?
- h. What is international organisation of legal metrology?

### SECTION-B

- Q2. Explain precision, resolution, sensitivity and zero error.
- Q3. Explain working principle of micrometer. How are the micrometers tested?
- Q4. What is CMM? Explain its main components and uses.
- Q5. Explain the principle and different scales of hardness testing.
- Q6. Explain pressure measuring gauges.
- Q7. Explain different types of sensors.
- Q8. What is meaning of tolerances? Explain hole based system and shaft based systems with the help of diagram.
- Q9. What is calibration? Explain its need and methodology.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**