**Roll No……..** **Total No. of Printed Pages: 1**

**Total No. of Questions: [09]**

**B. Tech ME (Semester – 5th)**
**MECHANICAL MEASUREMENT AND METROLOGY**
**Subject Code: BMECS1502**
**Paper ID: 18112325**

**Time: 03 Hours** **Maximum Marks: 60**

**Instruction for candidates:**

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

**Section – A** **(2 marks each)**

Q1. Attempt the following:

a) What are primary, secondary and tertiary measurements? Explain with examples.
b) Differentiate between the terms "Accuracy" and "precision" with suitable examples.
c) What are piezo-electric transducers?
d) What are bounded and unbounded gauges?
e) Give the method of vacuum measurement.
f) Enumerate the instruments used for angular measurement.
g) Define average surface roughness. What are various systems of measurement of surface roughness?
h) What is variable resistance transducer?
i) What is the function of an odometer?
j) Explain the general principle used in pneumatic measuring instruments.

**Section – B** **(5 marks each)**

Q2. Classify various comparators. Compare any two comparators in terms of at least one advantage and limitation in reference to each other.

Q3. Classify strain gauges. Explain the use and application of strain gauges in measurement. Comment on the relation between gauge factor and output response of a strain gauge.

Q4. What is meant by dynamic response? Explain its significance in reference to the measurement system

Q5. What is proving ring? How is it used to measure force?

Q6. Explain the working of a Linear Variable Differential Transformer for measurement of displacement.

**Section – C** **(10 marks each)**

Q7. Elaborate in detail the construction and working of a hot wire anemometer and Mcleod gauge

Q8. Explain various types of manometers with the help of diagrams.

Q9. Explain principle, constructional features, and working of an Ultrasonic flow meter with the help of a sketch. How is it different than other flow meters? Explain in detail major advantages and limitations of ultrasonic flow meter relative to other types.