

[illegible]

- Differentiate between primary, secondary and working standards.
- Explain clearly the terms : Calibration, speed of response, threshold and resolution, fidelity.
- Discuss in brief-systematic and random errors.
- Suggest methods for measuring surface roughness with brief working principle.
- Differentiate between bonded and unbonded type of strain gauges.
- Describe the working of a clinometers.
- State the principles of Design of Experiments.
- How is least count of vernier caliper determined?
- What is the order of pressure measured by thermal conductivity gauge?
- Explain the difference between optical and total radiation pyrometer.

SECTION-B

- Q2 What is sine bar? How it is used for angle measurement?
- Q3 Describe the equations for time response of a first order system when subjected to unit step input.
- Q4 A resistance wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stress of 100 MN/m^2 . The modulus of elasticity of steel is 200 GN/m^2 . Calculate the percentage change in the value of the gauge resistance due to applied stress.
- Q5 Describe the properties of materials used for piezoelectric transducers.
- Q6 Explain the construction and working of McLeod gauge used for measurement of vacuum.

SECTION-C

- Q7 The following 10 observations were recorded when measuring a temperature : 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5 and 41.8 °C. Find (i) the mean (ii) the standard deviation (iii) the probable error of one reading (iv) the probable error of mean and (v) range.
- Q8 Describe the construction, theory and working of thermocouples. Discuss the different types of compensations used.
- Q9 Write a note on the following :
- a) Hydraulic load cell.
 - b) Absorption dynamometer.