

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026

Subject Code: 3141709

Date: 16/06/2026

Subject Name: Principle of Measurement Science

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1** (a) State laws of thermocouple. **03**
(b) Compare capacitive and inductive transducers. **04**
(c) What are the various types of errors in measurement? Explain each briefly. **07**
- Q.2** (a) Differentiate between static and dynamic characteristics. **03**
(b) Explain cold junction compensation in thermocouples. **04**
(c) Compare hot cathode vs cold cathode ionization gauges for vacuum measurement. **07**
- OR
- Q.2** (c) Compare Orifice meter vs Venturi meter vs Rotameter for industrial flow measurement. **07**
- Q.3** (a) Differentiate between active and passive transducers. **03**
(b) Describe operation of an electromagnetic flow meter and its limitations. **04**
(c) Explain the working principle of a Resistance Temperature Detector (RTD) with a neat diagram. **07**
- OR
- Q.3** (a) Define absolute, gauge and vacuum pressure. **03**
(b) Explain air purge method of level measurement. **04**
(c) Explain the principle of hydrostatic pressure method for liquid level measurement. **07**
- Q.4** (a) Differentiate between repeatability and reproducibility. **03**
(b) Explain the principle of McLeod gauge. **04**
(c) Explain how a strain gauge pressure transducer converts pressure into an electrical signal. **07**
- OR
- Q.4** (a) Explain how hysteresis and drift can cause long-term measurement errors. **03**
(b) Write short note on Bourdon tube gauge. **04**
(c) Describe the signal conditioning circuit required for a thermistor. **07**
- Q.5** (a) State advantages of piezoelectric sensors. **03**
(b) Explain 3-wire RTD circuit for resistance measurement. **04**

(c) Illustrate how differential pressure (DP) transmitters are used for flow and level measurements. **07**

OR

- Q.5**
- (a) Evaluate suitability of radiation vs contact sensors in steel industry. **03**
 - (b) Explain capacitance level measurement. **04**
 - (c) Evaluate the selection of electromagnetic vs ultrasonic flow meter for slurry measurement. **07**
