

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 2170913

Date: 01/06/2026

Subject Name: Industrial Instrumentation

Time: 02:30 PM TO 05:00 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) Define the following Terms: 1) Accuracy 2) Resolution 3) Sensitivity **03**
 - (b) Differentiate primary and secondary transducer with suitable example. **04**
 - (c) Define an electrical transducer? Classify transducers on different basis. **07**
- Q.2**
- (a) State the applications of strain gauge. **03**
 - (b) Write a short note on Hall effect transducer. Also state its applications. **04**
 - (c) Describe with neat sketches, the construction and working of LVDT with advantages and disadvantages. Draw its output characteristic. Describe application of it for pressure measurement. **07**
- OR**
- (c) Describe, with neat sketches, construction and working of Thermocouple with its characteristic, advantages and disadvantages. **07**
- Q.3**
- (a) Define: 1) gauge pressure 2) absolute pressure 3) differential pressure **03**
 - (b) Enlist different types of load cells. Briefly explain any one of them. **04**
 - (c) Explain construction and working of Ultrasonic Flow Meter. Also state its merits and demerits. **07**
- OR**
- Q.3**
- (a) Enlist methods of torque measurement. Explain any one of them in brief. **03**
 - (b) Define synchros and state its application. **04**
 - (c) What is piezoresistive effect? Explain the term gauge factor with respect to resistance strain gauge and obtain its expression in terms of Poisson's ratio. **07**
- Q.4**
- (a) What is Dummy gauge? **03**
 - (b) Differentiate RTD, thermocouple and thermistor. **04**
 - (c) Explain how McLeod gauge measures the vacuum pressure. **07**
- OR**
- Q.4**
- (a) State Flow measuring instruments. **03**
 - (b) Explain how level can be measured using capacitive principle. **04**
 - (c) Explain construction and working of optical pyrometer. **07**
- Q.5**
- (a) Explain the need of recorders and draw block diagram of the digital recording system. **03**

- (b) Explain how cold junction compensation is done in thermocouple. **04**
- (c) Explain dual slope A/D circuits in digital data acquisition. **07**

OR

- Q.5** (a) Describe sample and hold circuits. **03**
- (b) Explain the working principle of a Venturi meter. **04**
- (c) Draw a generalized diagram of Digital data acquisition system and explain each component briefly. Mention the essential functional operations of a Digital data acquisition system. **07**
