

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2023****Subject Code:2170913****Date:12-12-2023****Subject Name: Industrial Instrumentation****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.

		MARKS
Q.1	(a) Define industrial instrumentation. Draw functional block diagram of an instrumentation system.	03
	(b) Differentiate primary and secondary transducer with suitable example.	04
	(c) What is Gauge factor? Derive the expression for Gauge factor in terms of Poisson's ratio.	07
Q.2	(a) Enlist the application of strain gauge.	03
	(b) State basic principle of capacitive transducer. How it can be used for measuring displacement? Explain with diagram.	04
	(c) State basic principle of piezo electric transducer. Draw an equivalent circuit. Also derive an equation for the output voltage.	07
	OR	
	(c) Describe, with neat sketches, construction and working of LVDT with its characteristic, advantages and disadvantages.	07
Q.3	(a) Define	03
	i. Absolute pressure	
	ii. Gauge pressure	
	iii. Static pressure	
	(b) Sketch bellows, label it and explain its working.	04
	(c) What is load cell? Describe proving ring type load cell with its advantages.	07
	OR	
Q.3	(a) Enlist the low and vacuum pressure gauge. Also state its range for the measurement.	03
	(b) Sketch C - type bourdon tube, label it and explain its working.	04
	(c) Explain in-line rotary torque sensor with neat sketch. Also state its application.	07
Q.4	(a) Enlist an application of ultrasonic level sensor.	03
	(b) How differential pressure meter works? Explain with the help of any one example with diagram.	04
	(c) Describe rotameter with neat sketch. Also mention its merits and demerits.	07
	OR	
Q.4	(a) Draw neat sketch of the Air Purge System and label it.	03
	(b) Differentiate RTD, thermocouple and thermistor.	04
	(c) Describe ultrasonic flow meter with neat sketch. Also mention its merits and demerits.	07
Q.5	(a) How sample and hold circuit works?	03
	(b) What is the use of recorders? Enlist the type of recorders.	04
	(c) Describe RTD with neat sketch. Also enlist its application.	07
	OR	
Q.5	(a) Draw the block diagram of modern digital data acquisition system.	03

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| (b) | Explain radiation type pyrometer with diagram. | 04 |
| (c) | Describe thermocouple with neat sketch. Also enlist its application. | 07 |
