Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3161008 Date:21-11-2025

Subject Name:Sensors and Transducers

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.**

			MARKS
Q.1	**(a)**	Define (1) Drift (2) Precision (3) Accuracy.	**03**
	(b)	Define (1) Measuring Lag (2) Fidelity (3) Dynamic Error (4) Speed of Response.	**04**
	(c)	Any two temperature sensors, any two pressure sensors, and any two light sensors can be listed. Explain any one of these six sensors in detail.	**07**
Q.2	**(a)**	How a thermistor differs from a thermocouple as a temperature sensor.	**03**
	(b)	Differentiate characteristics of RTD and Thermistor.	**04**
	(c)	Summarize the construction, principle, and working of a thermistor and its resistance temperature characteristic.	**07**
		OR	
	(c)	Describe with neat diagram and output characteristics the principle of LVDT construction and operation.	**07**
Q.3	**(a)**	List out various types of Strain Gauges.	**03**
	(b)	Compare Capacitive and Inductive transducers.	**04**
	(c)	What is meant by LIDAR? Explain its various components, functionalities, and applications.	**07**
		OR	
Q.3	**(a)**	Define Hall- effect and justify its applications of it.	**03**
	(b)	Explain Tactile Sensor.	**04**
	(c)	Discuss the operation of a Strain Guage and evaluate its applications as a force sensor.	**07**
Q.4	**(a)**	State advantages of fiber Optic sensors and write its applications.	**03**
	(b)	Define Dark Resistance and list out some materials used for the construction of LDR.	**04**
	(c)	Explain the working of Hay's bridge with suitable phasor diagram.	**07**
		OR	
Q.4	**(a)**	Explain Photo Conductive Cell in brief.	**03**
	(b)	Explain Power Factor meter.	**04**
	(c)	Explain the working of kelvin's double bridge for measurement of low resistance with a neat diagram.	**07**
Q.5	**(a)**	List out any two applications which need MEMS sensors.	**03**
	(b)	Draw and explain Sample and Hold Circuit.	**04**
	(c)	Explain any one type of ADC with a neat diagram.	**07**
		OR	
Q.5	**(a)**	Define GPS and list the applications.	**03**
	(b)	What is signal conditioning and why is it required.	**04**
	(c)	Explain any one type of DAC with a neat diagram.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3161008 Date:02-12-2024

Subject Name: Sensors and Transducers

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 following: 1.Threshold 2.Drift 3.Fidelity	**03**
	(b)	List down sensor classification.	**04**
	(c)	What are the different techniques to calibrate sensors? Explain any one of them in	**07**
Q.2	**(a)**	Describe working of Radiation temperature sensor.	**03**
	(b)	Explain thermoelectric effects for thermocouple.	**04**
	(c)	What is thermistor? How does it sense temperature? Explain its one of application.	**07**
		OR	
	(c)	Explain the operation and application of Laser range Sensor (LIDAR).	**07**
Q.3	**(a)**	What are the advantages and disadvantages of LVDT?	**03**
	(b)	Define motion sensor. List the various types of motion sensors. List the motion sensors application.	**04**
	(c)	Describe the construction and working of magnetic sensors.	**07**
		OR	
Q.3	**(a)**	What is gauge factor? What are the different types of strain gauge?	**03**
	(b)	Define load cell. List out the various kinds of load cells. Enumerate use of load cell.	**04**
	(c)	Define Hall Effect. Draw and explain the Hall Effect sensor.	**07**
Q.4	**(a)**	What is piezo electric effect? What are the classifications of piezoelectric transducers?	**03**
	(b)	What is fiber optic sensor Draw and explain the block diagram of fiber optic sensor.	**04**
	(c)	Explain the basic principle of gyroscope and its types.	**07**
		OR	
Q.4	**(a)**	Define encoder. List out types of encoder.	**03**
	(b)	What is the principle of capacitive transducer? What are the desirable features of capacitive transducer?	**04**
	(c)	Explain the construction and working of photo voltaic with near sketch.	**07**
Q.5	**(a)**	What is meant by signal conditioning and why it is required?	**03**
	(b)	List out the objectives of data acquisition system.	**04**
	(c)	Describe operation of sample and hold circuits with relevant waveform.	**07**
		OR	
Q.5	**(a)**	List down applications of Attenuators.	**03**
	(b)	Contrast the types of amplifiers that can be used with sensors. Assess the need of amplifiers in sensing applications.	**04**
	(c)	Explain the construction and working of single channel and multi-channel data acquisition system.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3161008 Date:11-12-2023

Subject Name:Sensors and Transducers

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)**	Differentiate between Sensor and Transducer.	**03**
	(b)	Explain Sample and Hold Circuit.	**04**
	(c)	Explain classification of Sensors.	**07**
Q.2	**(a)**	Define : (i) Accuracy (ii) Repeatability (iii) Resolution	**03**
	(b)	Explain types of errors.	**04**
	(c)	Describe the RTD and explain how RTD can be used to measure temperature.	**07**
		OR	
	(c)	Explain the construction of thermistor and its resistance temperature characteristics.	**07**
Q.3	**(a)**	Write the application of Tactile Sensor.	**03**
	(b)	Write short note on Load cell.	**04**
	(c)	Explain the principle of operations of LVDT with the help of neat sketch and characteristics.	**07**
		OR	
Q.3	**(a)**	Explain Laser Range Sensor.	**03**
	(b)	Write short note on Proximity Sensor.	**04**
	(c)	Explain types of Magnetic Sensor with its principle and advantages.	**07**
Q.4	**(a)**	Explain IR Sensor.	**03**
	(b)	Explain ultrasonic flow meter.	**04**
	(c)	Classify the types of bridges used for measurement techniques and explain any one in detail.	**07**
		OR	
Q.4	**(a)**	Explain electronic energy meter.	**03**
	(b)	What are the applications of Attenuators.	**04**
	(c)	Explain Photo Conductive Cell and Photo Voltaic Cell.	**07**
Q.5	**(a)**	Explain Bluetooth Sensor.	**03**
	(b)	Explain R-2R ladder D-A convertor.	**04**
	(c)	Explain Differential amplifier and Instrumentation amplifier.	**07**
		OR	
Q.5	**(a)**	Write the application of sensors in drone.	**03**
	(b)	Explain GPS (Global Positioning System).	**04**
	(c)	Write note on Successive Approximation type A-D converter.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3161008 Date:16-12-2022

Subject Name:Sensors and Transducers

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.**

			MARKS
Q.1	**(a)**	Give sensor classification	**03**
	(b)	Define following term: 1) Sensitivity 2) Hysteresis 3) Precision 4) Accuracy	**04**
	(c)	Explain Transducer with its characteristics and also give advantages and disadvantages.	**07**
Q.2	**(a)**	Explain calibration technique	**03**
	(b)	Explain the function block of the measurement system with neat diagram.	**04**
	(c)	Describe the RTD and explain how it can be used to measure temperature.	**07**
		OR	
	(c)	Explain the principle of operations of LVDT with the help of neat sketch and characteristics.	**07**
Q.3	**(a)**	What is smart sensor? Mention application of smart sensor.	**03**
	(b)	Explain RVDT.	**04**
	(c)	What is gyroscope sensor? Explain its type and give its application.	**07**
		OR	
Q.3	**(a)**	Explain GPS (Global Positioning System.) Also give advantages.	**03**
	(b)	Explain types of stain gauges.	**04**
	(c)	Explain thermocouple construction and also give advantages, limitations of it.	**07**
Q.4	**(a)**	Define: Amplifiers.	**03**
	(b)	Explain orifice meter for flow measurement.	**04**
	(c)	Explain heat transfer using thermal conduction.	**07**
		OR	
Q.4	**(a)**	Explain RTD with advantages.	**03**
	(b)	Explain uses of data acquisition system.	**04**
	(c)	Explain MEMS sensor, working principle also give advantage and applications.	**07**
Q.5	**(a)**	Give principle and construction of Load cell.	**03**
	(b)	What is sample and hold circuit? Explain with circuit diagram.	**04**
	(c)	Explain Direct Digitization and processing.	**07**
		OR	
Q.5	**(a)**	Describe about DAQ? What is the need for DAQ?	**03**
	(b)	Explain Touch screen sensor.	**04**
	(c)	Explain how the fiber optic sensor work and list out its advantages.	**07**

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