Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3151708 Date:11-12-2023

Subject Name:Measurement in industry

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)**	Discuss the basic principle of resistive transducer used for angular displacement.	**03**
	(b)	Give the difference between PSD detectors (Position sensitive detector) and CCD (Charge Couple Device) detectors used in LASER transducer.	**04**
	(c)	Discuss the basic principle of chromatography along with its application. Explain High Performance Liquid Chromatography (HPLC) instrument with its basic setup.	**07**
Q.2	**(a)**	Draw the construction of servomechanism application of synchros.	**03**
	(b)	Discuss the basic principle of capacitive transducer for displacement measurement.	**04**
	(c)	Draw & discuss the flapper nozzle system for displacement measurement along with its merits & demerits.	**07**
		OR	
	(c)	Draw and explain the construction of LVDT for displacement measurement along with its characteristic curve.	**07**
Q.3	**(a)**	Compare bonded and unbounded strain gauge.	**03**
	(b)	Draw & Discuss the microlaser interferometer for displacement measurement.	**04**
	(c)	Discuss the principle of digital displacement transducer. Draw the construction of 4-bit gray coded absolute encoder for angular displacement.	**07**
		OR	
Q.3	**(a)**	Define following terms with respect to strain gauge: i) Range ii) Temperature Sensitivity iii) Response Time	**03**
	(b)	Describe bridge circuit method for strain measurement.	**04**
	(c)	Discuss the following terms: “stress” and “strain”. Enlist various types of strain gauges and explain semiconductor strain gauge in detail with neat diagram.	**07**
Q.4	**(a)**	Discuss vibrating U-tube densitometer with neat diagram.	**03**
	(b)	Describe the principle and operation of electrolytic hygrometer.	**04**
	(c)	Explain electrodeless method of conductivity measurement along with its advantages and disadvantages.	**07**

OR

Q.4	**(a)**	Draw & discuss the principle of dual-beam nephelometer.	**03**
	(b)	Define pH. Discuss electrode method of pH measurement.	**04**
	(c)	Discuss Newtonian and non-Newtonian behavior of fluids. Explain Ostwald viscometer with neat diagram.	**07**
Q.5	**(a)**	Discuss the construction of catalytic combustion analyzer used for industrial gas analysis.	**03**
	(b)	Enlist various types of detectors used in gas chromatography. Discuss any one of them in detail.	**04**
	(c)	Discuss the paramagnetic property of oxygen. Explain differential pressure-type oxygen analyzer.	**07**

OR

Q.5	**(a)**	Discus the principle of auger electron spectroscopy.	**03**
	(b)	Discuss the basic principle of operation of atomic absorption spectrometry.	**04**
	(c)	Discuss the basic steps of mass spectrometry. Enlist various methods of mass analyzers and explain any one of them in detail.	**07**

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