Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3151708 Date:11-01-2023

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)**	What is meant by pH? Discuss any one type of the electrode used for pH measurement.	**03**
	(b)	Discuss Newtonian and non-Newtonian behavior of various fluids in viscosity measurement.	**04**
	(c)	Draw the schematic diagram of a gas chromatograph. Discuss each of its components in detail.	**07**
Q.2	**(a)**	Discuss the terms: "stress" and "strain".	**03**
	(b)	Compare bonded and unbounded strain gauge. Discuss Semiconductor gauge.	**04**
	(c)	Enlist the properties of ultrasound. Draw block diagram of pulse-echo ultrasound system for displacement measurement with its individual block description	**07**
		OR	
	(c)	Explain the principle of capacitive displacement transducer along with its advantages and disadvantages.	**07**
Q.3	**(a)**	Discuss the principle of eddy current type proximity sensor	**03**
	(b)	"Excitation frequency in LVDT should be higher than the frequency of core movement". State True or False. Justify the answer.	**04**
	(c)	How absolute encoder is different from incremental encoder? Draw & discuss 3-bit Gray Coded absolute encoder for angular motion.	**07**
		OR	
Q.3	**(a)**	Draw the servomechanism application of synchros with an input rotor angle deflection of 30^{o}.	**03**
	(b)	Give the difference between Position sensitive detector and CCD detectors used in Laser transducer.	**04**
	(c)	Draw and explain the construction of LVDT for displacement measurement with its signal processing block diagram.	**07**
Q.4	**(a)**	Discuss the significance of opacity measurement in industry.	**03**
	(b)	How is the conductivity of an aqueous solution defined? How does the dilution affect the Conductivity?	**04**
	(c)	Define paramagnetism. Explain magnetic wind type paramagnetic oxygen analyzer with its merits and demerits.	**07**
		OR	
Q.4	**(a)**	Define conductivity. Discuss in brief Electrode less method of measuring conductivity.	**03**
	(b)	Discuss bubbler tube method for density measurement.	**04**

	(c)	Explain thermal conductive analyzer used for gas analysis with its basic principle.	**07**
Q.5	**(a)**	Discuss the basic principle of chromatography.	**03**
	(b)	Give the difference between classical liquid chromatography and HPLC (High-Performance Liquid Chromatography).	**04**
	(c)	Enlist various methods of ionization used in mass spectrometry. Explain any one of them with its basic principle of operation.	**07**

OR

Q.5	**(a)**	Discuss the Ostwald Viscometer.	**03**
	(b)	Explain the basic principle of mass spectrometry.	**04**
	(c)	Explain the principle of UV-Visible absorption spectrometer. Draw & discuss various components of UV-visible absorption spectrophotometer.	**07**

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