Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V EXAMINATION – SUMMER 2025

Subject Code:3151302 Date:17-05-2025

Subject Name:Advance Environmental 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)**	Discuss the Stefan- Boltzmann law with its applications.	**03**
	(b)	Explain the different types of electronic transitions in molecules.	**04**
	(c)	Discuss the significance of 'Advanced Environmental Instrumentation' in environmental engineering field.	**07**
Q.2	**(a)**	Derive the beer-lambert's law.	**03**
	(b)	1. Explain the various affecting factors the absorption spectral bands in organic compounds.	**03**
		2. Calculate molar absorptivity of a solution containing 2.5×10^{-5} M of a substance if in a 2 cm cell at 400 nm is 56%.	**01**
	(c)	Draw a block diagram of IR Spectroscopy and discuss working principle in detail.	**07**
		OR	
	(c)	Draw a block diagram of UV-Visible Spectroscopy and discuss working principle in detail.	**07**
Q.3	**(a)**	Highlight the environmental significance of turbidity.	**03**
	(b)	Explain Retention time and Retention volume as chromatographic parameters.	**04**
	(c)	Explain working of Gas Chromatography and draw schematic block diagram.	**07**
		OR	
Q.3	**(a)**	Explain the measurement of turbidity by visual method with neat sketch of the instrument.	**03**
	(b)	Explain Capacity factor, Resolution, and Peak asymmetry as chromatographic parameters.	**04**
	(c)	Explain working of High Performance Liquid Chromatography and draw schematic block diagram.	**07**
Q.4	**(a)**	Explain the terms: Conductance, Resistances, Cell constant.	**03**
	(b)	Along with the neat sketch explain the pH and DO electrode.	**04**
	(c)	Enlist different methods of oxidation used in TOC analyzer.	**07**

OR

Q.4	**(a)**	Explain the principle of conductivity meter.	**03**
	(b)	Highlight the applications of Ion- selective meter and pH meter.	**04**
	(c)	Highlight the significance of TOC. Discuss the classification of TOC.	**07**
Q.5	**(a)**	Explain the statistical techniques to treat data with random errors.	**03**
	(b)	Discuss the application of Atomic Absorption Spectrophotometer in environmental engineering field.	**04**
	(c)	Discuss the Continuous Effluent Monitoring system in detail.	**07**

OR

Q.5	**(a)**	Differentiate between determinant error and indeterminate error.	**03**
	(b)	Discuss the application of Gas Chromatography in environmental engineering field.	**04**
	(c)	Discuss the Continuous Emission Monitoring system in detail.	**07**

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