

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V(New) • EXAMINATION – WINTER 2016****Subject Code:2151302****Date:22/11/2016****Subject Name:Advanced Environmental 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.

		MARKS
Q.1	Short Questions	14
	1 Define the term true value.	
	2 Define the statistical term: 'coefficient of variation'.	
	3 Write an application visual colourimetry	
	4 Give an application of mass spectroscopy in the field of environmental analysis.	
	5 What is the use of monochromator in spectroscopy?	
	6 Define the term: 'R _f value'.	
	7 What is column chromatography?	
	8 Define retention time with respect to chromatography.	
	9 State the principle of flame emission spectroscopy.	
	10 What material is used as stationary phase in TLC?	
	11 What are called optical instruments?	
	12 Define the term capillary action.	
	13 State the principle of ion selective electrode.	
	14 What is called online sensor?	
Q.2	(a) Give significance of 'Advanced Environmental Instrumentation' in environmental engineering.	03
	(b) Give the modern classification of chromatographic techniques with one example of each.	04
	(c) Explain Lambert-Beer law with applications and exceptions.	07
	OR	
	(c) Write a short note on IR spectroscopy with principle, instrumentation and applications in environmental analysis.	07
Q.3	(a) Give the difference between Raman Spectroscopy and Infrared Spectroscopy.	03
	(b) Explain any one visual method for turbidity measurement.	04
	(c) Write a note on ion exchange chromatography.	07
	OR	
Q.3	(a) Draw a figure of electromagnetic spectrum indicating different spectral regions with wavelengths and frequencies.	03
	(b) What is call potentiometry? List advantages of this method in environmental analysis.	04
	(c) Write a short note on atomic absorption spectroscopy.	07
Q.4	(a) Give significance of chromatographic analysis in environmental field.	03
	(b) Explain rules governing significant figures.	04
	(c) Define terms NTU and FTU. Differentiate the terms Turbidimetry and Nephelometry with proper diagrams.	07
	OR	
Q.4	(a) List three advantages and three limitations of ion selective electrodes.	03
	(b) Define the types of determinate errors with at least one example of each.	04

- (c) Write a short note on high performance liquid chromatography including applications in the environmental engineering. **07**
- Q.5** (a) Define the terms mean, median and standard deviation. **03**
- (b) Give applications and limitations of Gas Chromatography. **04**
- (c) Write a short note on conductivity meter with analytical applications. **07**

OR

- Q.5** (a) Explain accuracy and precision with an example. **03**
- (b) Write Applications of DO Sensors. **04**
- (c) Write a short note on TOC analyzer as an advanced analytical instrument in environmental analysis. **07**
