

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- V EXAMINATION – SUMMER 2026

Subject Code:3151302

Date:09-06-2026

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) Define: scattering, absorption & emission, with reference to optical instruments. **03**
(b) Differentiate between visual and instrumental method of turbidity analysis. **04**
(c) Define Chromatography. With the help of neat sketch explain components of Gas chromatography. **07**
- Q.2** (a) Explain principle of UV-Visible spectrophotometer. **03**
(b) List various types of molecular vibrations due to irradiation of low energy light. Explain them with neat sketch **04**
(c) Explain the working principle of Atomic absorption spectrophotometer. Draw its neat sketch and highlight its applications. **07**
- OR**
- (c) Write a note on visual method of turbidity analysis. **07**
- Q.3** (a) Which factors affect the chromatographic separation? Explain them. **03**
(b) Enlist different types of detectors used in chromatographic analysis. Mention application of each type of detector. **04**
(c) Which types of columns are used in gas chromatography. Explain them with applications. **07**
- OR**
- Q.3** (a) Highlight the applications of HPLC. **03**
(b) Explain following chromatographic parameters: retention time, retention volume, resolution, peak asymmetry. **04**
(c) Draw a neat sketch and explain instrumentation of HPLC. **07**
- Q.4** (a) Briefly explain the type of spectrum. **03**
(b) Discuss the principle of Infrared Spectrophotometer and list its components. **04**
(c) Derive the equation of specific conductance and explain principle of conductivity meter. **07**
- OR**
- Q.4** (a) Explain principle of ion selective meter and DO meter. **03**
(b) Enlist the oxidation methods used in TOC analyzer for oxidation of organic compounds. Explain them. **04**
(c) Enlist components of pH meter and explain them. **07**
- Q.5** (a) Write down the expressions to find: Average deviation, relative average deviation, standard deviation, coefficient of variance, variance and Students'T. **03**
(b) Highlight the need of analytical instrument in environmental engineering field. **04**
(c) Enlist and explain the types on online sensors used in environmental engineering field. **07**

OR

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| Q.5 | (a) Explain accuracy and precision with example | 03 |
| | (b) Differentiate between determinate and indeterminate error. | 04 |
| | (c) Write a note on column chromatography. | 07 |
