Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III EXAMINATION – SUMMER 2025

Subject Code:3131305 Date:29-05-2025

Subject Name:Environmental Chemistry-I

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 importance of calibration of glassware and instruments for analyst. **03**

(b) Discuss the significance of solids and pH in water. **04**

(c) Explain the procedure of determination of total hardness in water sample as per standard method. **07**

Q.2 **(a)** Define following terms: Molality, Morality and Normality **03**

(b) Differentiate between distilled water and de-mineralized water **04**

(c) List the characteristic of primary and secondary standards and give example of each. **07**

OR

(c) Explain the procedure to determine concentration of sulphate in water sample as per standard method. **07**

Q.3 **(a)** Write the uses of following instruments: **03**
i) BOD incubator, ii) Magnetic stirrer, iii) Laminar air flow, iv) Autoclave,
v) high volume air sampler, vi) hot air oven

(b) Explain oxygen electrode system with schematic diagram. **04**

(c) State the principle of the instrument based on scattering of light. Explain components of turbidity meter with the help of a neat sketch. **07**

OR

Q.3 **(a)** Explain oxygen electrode system with schematic diagram **03**

(b) Explain the principle of Spectrophotometer with neat sketch. **04**

(c) Write down the procedure for standardization of : **07**
(i) 0.01M EDTA solution and (ii) 0.0141N $AgNO_3$ solution.

Q.4 **(a)** What is the pH of a 0.05M sodium hydroxide solution? **03**

(b) State and explain Dalton's law of partial pressure and Henry's Law **04**

(c) The following test results were obtained for four different wastewater samples. The size of the sample was 100 mL. Determine the concentration of total and volatile solids, expressed as mg/L, for one of the samples. **07**

Item	**Unit**	**Weight, g**	
		A	**B**
Sample size	mL	50	100
Total mass of evaporating dish	g	11.6435	21.6445
Mass of evaporating dish plus residue after evaporation at 105^0 C	g	11.6783	21.6832
Mass of evaporating dish plus residue after ignition at 550^0 C	g	11.6768	21.6795

OR

Q.4 **(a)** Highlight the need of a standard method for analysis of water and wastewater quality parameters. **03**

(b) For the following samples, calculate hydroxide, carbonate, and bicarbonate alkalinity by the procedure (Alkalinity and pH measurements). The sample size is 100 mL, N/10 sulfuric acid is used as the titrant and the water temperature is 25°C. **04**

Sample pH :11, mL titrant to reach Phenolphthalein end point: 10 ml , total mL titrant to reach methyl orange end point: 15.5 ml

(c) Give classification of sampling techniques and explain each of them with their importance. **07**

Q.5 **(a)** Enlist processes of demineralization of water. Highlight applications of demineralized water. **03**

(b) Explain principle of electro-dialysis process of demineralization of water with neat sketch. **04**

(c) Explain the procedure to carry out determination of chloride in laboratory **07**

OR

Q.5 **(a)** Draw a flow diagram indicating the process of production of ultra pure water. Label it appropriately. **03**

(b) Differentiate between gravimetric analysis and volumetric analysis. **04**

(c) Write the procedure of determination of total solids and total dissolved in water. **07**

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