

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2024

Subject Code:3131305

Date:19-07-2024

Subject Name: Environmental Chemistry-I

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.

- Q.1**
- (a) Discuss the importance of qualitative and quantitative analysis in environmental engineering field. **03**
 - (b) Explain step by step procedure for cleaning the glassware used in analysis. **04**
 - (c) Explain the procedure for determination of alkalinity of a water sample. **07**

- Q.2**
- (a) Highlight the significance of hardness in water supplies and utilities. **03**
 - (b) Define valency. Prepare a list of elements having more than one valences and state their oxidation numbers. (Eg. Fe : +2, +3 , 0) **04**
 - (c) Discuss the importance of standard methods for analysis of water and wastewater quality parameters. **07**

OR

- (c) Prepare a list of glassware and instrument used in quantitative analysis and explain their uses. **07**

- Q.3**
- (a) With the help of a titration curve explain three types of alkalinity. **03**
 - (b) State and explain Dalton's law of partial pressure and Henry's Law. Highlight their application in environmental engineering field. **04**
 - (c) Write down the procedure for standardization of : **07**
(i) 0.01M EDTA solution and (ii) 0.0141N AgNO₃ solution.

OR

- Q.3**
- (a) Differentiate between accuracy and precision **03**
 - (b) Define the terms: precipitation, filtration, concentration and drying **04**
 - (c) Explain step by step procedure to prepare the following reagent and also explain steps to standardize 1000 mL 0.02 N NaOH **07**

- Q.4**
- (a) Explain the principle of Spectrophotometer. **03**
 - (b) Why we need to apply the blank correction for titration values in both the Mohr's and mercuric nitrate method of chloride determination. **04**
 - (c) Explain the process of ion-exchange for demineralization of water. Highlight its advantages and disadvantages. **07**

OR

- Q.4** (a) Enlist types of hardness present in water. Explain in brief each type. **03**
(b) Explain oxygen electrode system with schematic diagram. **04**
(c) Explain the standard method of determination of hardness. Explain with chemical reactions. **07**

- Q.5** (a) Highlight the sources of chlorides, hardness and alkalinity in water bodies. **03**
(b) Write a note on the pH electrode and draw its sketch. **04**
(c) Draw a flowchart indicating different types of solids. Write definition of each type of solids. **07**

OR

- Q.5** (a) Prepare a list of different types of electrodes used in analysis of water. **03**
(b) Explain the significance of drying and ignition temperatures in analysis of different types of solids. **04**
(c) Enlist different standard methods for analysis of chloride. Explain any one with chemical reactions. **07**
