

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3141309

Date:18-07-2024

Subject Name: Fundamentals of Wastewater Quality

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) Differentiate between BOD and COD. **03**
(b) Explain the brownian movement of colloidal suspension with neat sketch. **04**
(c) Explain chemistry involved for COD determinations. **07**

- Q.2** (a) Explain the principle of dialysis with neat sketch. **03**
(b) Define binary mixture. Explain any one of its type briefly. **04**
(c) Explain the phenomena of common ion effect with example. **07**

OR

- (c) Explain in physisorption and chemisorptions. State difference between them. **07**

- Q.3** (a) The solubility product K_{sp} for calcium sulphate in water is 2.96×10^{-4} . Determine the equilibrium Ca^{+2} concentrations in mg/l for a saturated calcium sulphate solution. **03**
(b) Discuss the mechanisms by which colloids can be coagulated. **04**
(c) List types of detergents. Explain in detail biological degradation of Detergents. **07**

OR

- Q.3** (a) Explain transformation reactions (any two) of organic matter by bacteria. **03**
(b) Explain role of intracellular and extracellular enzymes in biodegradation? **04**
(c) Explain hydrolysis of fats and oil with chemical reactions. **07**

- Q.4** (a) Write a the sources of CO_2 acidity and mineral acidity. **03**
(b) What is the theoretical COD of samples containing : **04**
a) 250 mg/L of Butanol and b) 250 mg/L phenol.
(c) Explain Modified Winkler method for DO determination with chemical reactions. **07**

OR

- Q.4** (a) Explain procedure for analysis of volatile acids in laboratory. **03**
(b) Explain crown corrosion with chemical reactions. **04**
(c) Which species of Nitrogen generally found in drinking water and wastewater. Write its possible sources and its significance. **07**

- Q.5** (a) Summarize significance of phosphorous in water and wastewater. **03**
(b) List the sources of organic matter and oil and grease in wastewater. **04**
(c) What is importance of following chemicals in BOD test: **07**
(i) Seed (ii) Aeration (iii) MnSO_4 (iv) phosphate buffer (v) FeCl_3 (vi) CaCl_2 (vii) Potassium Iodide.

OR

- Q.5** (a) Summarize significance and source of volatile acids in anaerobic treatment. **03**
(b) How can following interference eliminated during COD test? **04**
(a) Chloride (b) nitrite
(c) Write the method of sample preservation for following test **07**
(i) COD test (ii) dissolved oxygen test.
