Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2023

Subject Code:3141309 Date:17-01-2024

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.**

			MARKS
Q.1	**(a)**	State Le Chatelier's principle.	**03**
	(b)	Classify the colloids based on nature of interaction between Dispersed Phase and Dispersion Medium.	**04**
	(c)	Explain the sources and respective environmental significance of oil and grease in receiving waters.	**07**
Q.2	**(a)**	Explain the Environmental Significance of Oil & Grease.	**03**
	(b)	Define Conductivity. State the Ohm's law with application in Environmental Engineering field.	**04**
	(c)	Enlist the reagents are used in determination of COD. Highlight the importance of each along with reaction chemistry.	**07**
		OR	
	(c)	Classify the colloids based on nature of interaction between Dispersed Phase and Dispersion Medium.	**07**
Q.3	**(a)**	Define: Vapor Pressure in close and open system	**03**
	(b)	Determine the equilibrium pH of a solution made by adding acetic acid to water to give a concentration of 10^{-2} M at 25°C.	**04**
	(c)	Define : Seeding. Explain the significance of seeding in BOD test.	**07**
		OR	
Q.3	**(a)**	Explain the Tyndall effect in detail.	**03**
	(b)	Define Osmotic Pressure and it's correlation with Rault's law.	**04**
	(c)	Explain the environmental significance of (a) sulphates and (b) Nitrogen.	**07**
Q.4	**(a)**	Derive the Normality of Sodium Thiosulphate solution for DO test.	**03**
	(b)	Define with suitable examples: (i) Primary alcohol (ii) Secondary alcohol (iii) tertiary alcohol.	**04**
	(c)	Derive the Principle of Solvent Extraction.	**07**
		OR	
Q.4	**(a)**	A sample of wastewater was incubated for 7 days at 20 °C and showed a BOD of 208 mg/L. (Assume $k' = 0.35$/day). Calculate it's 5-day, 10-day and ultimate BOD.	**03**
	(b)	Write a short note on Biodegradation of Organic compounds.	**04**
	(c)	Describe the Winkler method with reaction chemistry.	**07**

Q.5	**(a)**	Concentration of Glucose in water sample is 35 mg/L. Estimate the oxygen equivalent concentration of this organic matter.	**03**
	(b)	The solubility of $PbBr_2$ is 0.012 M at 25°C. Calculate the Solubility Product i.e. Ksp for $PbBr_2$.	**04**
	(c)	Give the difference between: a. Aliphatic and Aromatic compounds b. Organic and Inorganic compounds c. Fat and Wax.	**07**

OR

Q.5	**(a)**	Enlist the applications of Oxidation Reduction Potential (ORP).	**03**
	(b)	Explain the biological properties of Pesticides.	**04**
	(c)	Describe the classification of Adsorption in detail.	**07**

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