Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2141302 **Date: 06/06/2017**

Subject Name: Environmental Sciences II

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What do you understand by Amphoteric Hydroxides?	
	2	Identify the dispersed phase and dispersion medium in Smoke.	
	3	Give examples of Lyophilic and Lyophobic colloids	
	4	Write the sources of Nitrogen in water and wastewater.	
	5	Draw any two isomeric forms of butane	
	6	Give any two examples of colloidal dispersion in air	
	7	Define Diverse ion effect	
	8	What do understand by Heterocyclic compounds?	
	9	Write a short note on ionic product of water	
	10	Enlist the names of any 2 pesticides found in the wastewater	
	11	Enlist sources of oil and grease in domestic wastewater	
	12	What are Volatile acids, give examples.	
	13	Write a generalized expression for Solubility Product.	
	14	Define LeChatelier's Principle.	
Q.2	**(a)**	Describe in brief the sample collection methodology for estimation of Dissolved Oxygen from a river stream.	**03**
	(b)	Explain the role of following chemicals in COD determination: (i) $K_2Cr_2O_7$ (ii) FAS (iii) $HgSO_4$ (iv) Ferroin	**04**
	(c)	Explain Kjeldahl method for Nitrogen estimation in detail.	**07**
		OR	
	(c)	Explicate the purpose and importance of seed, nutrients, dilution water and aeration in BOD determination	**07**
Q.3	**(a)**	Explain kinetic approach of Chemical Equilibrium	**03**
	(b)	How can common ion effect aid in wastewater treatment? Illustrate with example.	**04**
	(c)	Explicate the basic differences between BOD and COD	**07**
		OR	
Q.3	**(a)**	Colloids remain in suspension and don't settle. Justify the statement with suitable explanation.	**03**
	(b)	How will you determine Oil and Grease in laboratory?	**04**
	(c)	Determine the theoretical COD of the following compounds in mg/L in wastewater sample: (i) 1500 mg/L of Acetic Acid (ii) 1000 mg/L of Glucose	**07**
Q.4	**(a)**	Define with suitable examples: (i) Primary alcohol	**03**

(ii) Secondary alcohol (iii) tertiary alcohol.

(b) Write a note on biological properties of pesticides **04**

(c) Explain the principles of solvent extraction and derive the formula of how much constituents remains in the aqueous phase after η extractions? **07**

OR

Q.4 **(a)** Explain in brief about the following terms (i) Tyndall effect (ii) Brownian movement (iii) Adsorption **03**

(b) Give the difference between Aliphatic and Aromatic compounds, biodegradability point of view **04**

(c) Write a short note on binary mixtures and explain Class II binary mixtures with examples **07**

Q.5 **(a)** What do understand by Hardy Schulze Law and how is it significant in wastewater treatment. **03**

(b) Which modification is required in unmodified Winkler Method for Dissolved Oxygen? Why? **04**

(c) Explain in detail: Biological degradation of Detergents **07**

OR

Q.5 **(a)** Write a note on the Environmental Significance of colloids and its applications. **03**

(b) The solubility of $BaCO_3$ is 5.1 x 10^{-5} M at 25°C. Calculate the solubility product i.e. Ksp. **04**

(c) In determining the BOD_5 of a sample, an analyst added 2, 5, and 10 mL of sample to three different 300-mL BOD bottles and filled them with seeded dilution water. The analyst also prepared three blank bottles with the same dilution water and incubated the set at 20°C for 5 days. Dissolved-oxygen (DO) measurements were made on the samples before and after with the following results: **07**

Sample Size in bottle, mL	Initial DO, mg/L	Final DO, mg/L
2	8.1	5.6
5	8.0	1.7
10	8.1	0.0
Blank average	8.2	8.0

Calculate BOD_5 of the sample?

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