Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (New) • EXAMINATION – WINTER 2016

Subject Code: 2141302 **Date: 22/11/2016**

Subject Name: Environmental Sciences II

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Write the sources of Sulfates in water and wastewater.	
	2	Define common ion effect	
	3	Write the names of any 2 catalysts used in wastewater analysis	
	4	What do you mean by Amphoteric Hydroxides	
	5	Write the sources of oil and grease in wastewater	
	6	Give examples of Lyophilic and lyophobic colloids	
	7	Write a short note on Ionic Product of water	
	8	Give mathematical equation for finding the theoretical COD	
	9	Enlist the names of any two Anionic detergents	
	10	Define Isomerism	
	11	Enlist the chemical required for Sulfates determination	
	12	Give any two examples of colloidal dispersion in air	
	13	What are Volatile acids, give examples.	
	14	What do you understand by complex ions.	
Q.2	**(a)**	What do understand by Hardy Schulze Law and how is it significant in wastewater treatment.	**03**
	(b)	Write a note on the Environmental Significance of colloids and its applications.	**04**
	(c)	Explicate the basic differences between BOD and COD	**07**
		OR	
	(c)	Write in detail the method of determination of COD.	**07**
Q.3	**(a)**	Name the three general classes of synthetic detergents and give examples	**03**
	(b)	How will you determine Oil and Grease in laboratory?	**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.3	**(a)**	Give the difference between Aliphatic and Aromatic compounds, biodegradability point of view	**03**
	(b)	Explain the following terms in detail (ii) Tyndall effect (ii) Brownian movement	**04**
	(c)	Write a short note on binary mixtures and explain Class II binary mixtures with examples	**07**
Q.4	**(a)**	Write a note on biological properties of pesticides	**03**
	(b)	How can common ion effect aid in wastewater treatment? Illustrate with example.	**04**
	(c)	Explain the biochemistry of (i) Carbohydrates (ii) Proteins	**07**
		OR	

Q.4	**(a)**	Which modification is required in unmodified Winkler Method for Dissolved Oxygen? Why?	**03**
	(b)	Give the role of following chemicals in COD determination: (i) $K_2Cr_2O_7$ (ii) H_2SO_4 (iii) $HgSO_4$ (iv) FAS	**04**
	(c)	10 mL of sample is pipetted directly into a 300 mL BOD bottle. The initial DO of the diluted sample is 9.0 mg/L and its final DO is 3.0 mg/L. The initial DO of the dilution water is also 9.0 mg/L, but the final DO is 8.0 mg/L. The temperature of incubation is 20 °C. If the sample is incubated for 5 days, what is the BOD_5 of the sample?	**07**
Q.5	**(a)**	Which functional group is characteristic of each of the following: Alkenes, alcohol, aldehydes, ketons, acids and amines?	**03**
	(b)	Explain modified Winkler Method with chemical reactions for DO determination.	**04**
	(c)	The solubility of $PbBr_2$ is 0.012 M at 25 ^{0}C. Calculate the Solubility Product i.e. Ksp for $PbBr_2$.	**07**

OR

Q.5	**(a)**	Define with suitable examples: (i) Primary alcohol (ii) Secondary alcohol (iii) tertiary alcohol.	**03**
	(b)	Explain kinetic approach of Chemical Equillibrium	**04**
	(c)	Explicate the purpose and importance of seed, nutrients, dilution water and aeration in BOD determination	**07**

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