Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER 2013

Subject Code: 141302 **Date: 23-12-2013**

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.**

Q.1	**(a)**	Give name of commonly used pesticides. Explain biological properties of pesticides.	**07**
	(b)	Explain classification of alcohols. Enlist the name of the alcohols that are having commercial importance.	**07**
Q.2	**(a)**	Explain principles of solvent extraction and derive the formula of how much constituents remains in the aqueous phase after n extraction.	**07**
	(b)	Calculate the pH of a buffer solution containing 0.01 M acetic acid and 0.01 M sodium acetate. Then calculate the pH after enough HCl is added to give a concentration of 0.001 M. Take pK_A for acetic acid as 4.74 and pK_B for acetate is 9.26	**07**
		OR	
	(b)	Explain common ion effect.	**07**
Q.3	**(a)**	Explain membrane processes.	**07**
	(b)	Write a short note: Environmental significance of Colloids.	**07**
		OR	
Q.3	**(a)**	Write a short note: Classes of amino acids	**07**
	(b)	With reference to colloids explain the following terms: (i) Brownian movement (ii) Tyndall effect	**07**
Q.4	**(a)**	Explain in detail: Biological degradation of Detergents.	**07**
	(b)	The practical limit of technology in the removal of calcium carbonate ($CaCO_3$) hardness at normal plant operating condition is 40 mg/L of $CaCO_3$. What are the concentrations of the calcium and carbonate ions at 25 °C? Assume KSP(CaCO3) = $5 * 10^{-9}$	**07**
		OR	
Q.4	**(a)**	Give equilibrium reactions for the following compounds and give significance for the same: (i) AgCl (ii) $Al(OH)_3$ (iii) $CaCO_3$ (iv) $CaSO_4$ (v) $Fe(OH)_3$ (vi) $Zn(OH)_2$	**07**
Q.4	**(b)**	Ten milliliters of sample is pipeted directly into a 300-mL incubation bottle. The initial DO of the diluted sample is 9.0 mg/L and its final DO is 2.0 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)**	Explain with example, application of Iodometry and ORPmetry.	**07**

(b) Consider the treatment of an effluent having following characteristics: **07**

(i) Flow = 500 m^3/d,

(ii) Composition of wastewater:

Sucrose ($C_{12}H_{22}O_{11}$), concentration (c) = 380 mg/L, flow (Q) = 250 m^3/d

Formic acid (CH_2O_2), c = 430 mg/L, Q = 100 m^3/d

Acetic acid ($C_2H_4O_2$), c = 980 mg/L, Q = 150 m^3/d

Determine the final concentration of wastewater in terms of COD.

OR

Q.5 **(a)** Describe in brief the methods used for the determination of volatile acids. Explain applications of volatile acids data. **07**

(b) Enlist the chemicals required for estimating COD. Give role of the chemicals used for the same. **07**

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