

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: 141302****Date: 20-06-2014****Subject Name: Environmental Sciences - II****Time: 10:30 am - 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.

- Q.1** (a) Explain in detail: Chemical Equilibrium **07**
 (b) Differentiate: physical adsorption and chemisorption **07**

- Q.2** (a) What is buffers? Explain importance of buffers **07**
 (b) What do you mean by the term “Solubility-product”? explain its significance with reference to environmental engineering **07**

OR

- (b) In determining the BOD₅ 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

What is BOD₅ for the sample?

- Q.3** (a) Enlist the important oxidation-reduction reactions in anaerobic digestion **07**
 (b) Explain in detail: Environmental significance of Colloids **07**

OR

- Q.3** (a) Write a short note: Colloidal dispersions in air **07**
 (b) Explain in detail classification of alcohol with example **07**

- Q.4** (a) The molar concentration of the major ions in a brackish groundwater supply are as follows: Na⁺, 0.02; Mg²⁺, 0.015; Ca²⁺, 0.01; K⁺, 0.001; Cl⁻, 0.025; HCO₃⁻, 0.001; NO₃⁻, 0.002; and SO₄²⁻, 0.012. What would be the approximate osmotic pressure difference across a semipermeable membrane that had brackish water on one side and mineral-free water on the other, assuming the temperature is 25 °C? If a yield of 75 percent fresh water were desired, what minimum pressure would be required to balance the osmotic pressure difference that will develop? **07**

- (b) Explain classification of carbohydrates with example **07**

OR

- Q.4** (a) Explain in detail biological treatment of Protein waste **07**
 (b) How volatile acids can be measured? **07**

- Q.5** (a) Explain, with all the reactions, chemical principle involved in estimation of BOD **07**
 (b) Explain biological degradation of Detergents **07**

OR

- Q.5** (a) Explain in brief TOC **07**
 (b) Write a short note: Dialysis **07**
