

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012**

**Subject code: 141302****Date: 28/12/2012****Subject Name: Environmental Sciences-II****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain sources of Phenolphthalein Acidity & Methyl Orange Acidity. **07**  
 (b) Write the principle involved in determination of COD with chemical equations. **07**
- Q.2** (a) Explain Argentometric method for determination of chloride with chemical equations. **07**  
 (b) Determine COD value of following test data; **07**  
 Sample size taken = 20 ml (For blank and sample )  
 Blank reading of 0.25 N  $K_2Cr_2O_7$  = 28 ml  
 Sample reading of 0.25 N  $K_2Cr_2O_7$  = 15 ml  
 Volume of 0.25 N  $K_2Cr_2O_7$  = 25 ml (For blank and sample)
- OR**
- (b) Find out COD value of : **07**  
 (i) 1500 mg/l of Glucose  
 (ii) 1800 mg/l of Ethyl Alcohol.
- Q.3** (a) How dilution water for BOD test is prepared in the laboratory? **07**  
 (b) Write an application of Henry's law for DO determination. **07**
- OR**
- Q.3** (a) Determine BOD value of following test data; **07**  
 • Sample size taken = 5 ml  
 • Blank reading of 0.025 N  $Na_2CO_3$  = 6.5 ml  
 • Sample reading of 0.025 N  $Na_2CO_3$  = 2 ml  
 Sample was originally 25% diluted
- (b) Explain the importance of following terms related to BOD determination: **07**  
 Seed, Nutrients, Dilution Water, Aeration, Buffer Solution, refractory organics, biodegradable
- Q.4** (a) Write a short note on biodegradation of organic compounds. **07**  
 (b) What are the major factors contributing to the difference in bio-degradability of starch and cellulose? Explain each factor in detail.
- OR**
- Q.4** (a) Explain Aliphatic and Aromatic compounds with examples. **07**  
 (b) Explain the principles of solvent extraction and derive the formula of how much constituents remains in the aqueous phase after  $n$  extractions? **07**
- Q.5** (a) The solubility product  $K_{sp}$  for calcium sulphate in water is  $1.96 \times 10^{-4}$ . Determine the equilibrium  $Ca^{+2}$  concentration in mg/l for a saturated calcium sulphate solution. **07**  
 (b) Explain Ionization of Weak Acids with examples. **07**
- OR**
- Q.5** (a) Explain Complex Ion Formation with appropriate examples. **07**  
 (b) Explain Common Ion Effect with appropriate examples. **07**

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