

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. - SEMESTER – I • EXAMINATION – WINTER 2012****Subject code: 711702N****Date: 09-01-2013****Subject Name: Environmental Chemistry****Time: 02.30 pm – 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.
- 4.

- Q.1** (a) State Dalton's law of partial pressures. What tank volume is required to hold 10,000 kg of methane gas at 25 °C and 2 atm pressure. **07**
- (b) Discuss detrimental effects of soil pollutants. **07**

- Q.2** (a) Write short note on binary mixtures. **07**
- (b) The chloride concentration in a typical freshwater stream is  $10^{-3}$  M. If the  $\text{HgCl}_2$  (aq) concentration is  $10^{-8}$  M. (about the accepted limit for Hg in drinking water), what will be the concentrations of  $\text{Hg}^{2+}$ ,  $\text{HgCl}^{3-}$ ,  $\text{HgCl}_4^{2-}$ ? **07**
- OR

- (b) The following are the data from an experiment to assess the disinfection of a water supply with a given dose of chlorine. Assuming first order kinetics, determine the rate constant. **07**

Time, min	Percent coliform bacteria remaining	C/C <sub>0</sub>	ln(C/C <sub>0</sub> )
0	100	1.0	0.000
10	70	0.70	-0.357
20	21	0.21	-1.561
30	6.3	0.063	-2.765
60	0.6	0.006	-5.116

- Q.3** (a) Discuss methods of expressing alkalinity and application of alkalinity data **07**
- (b) Write short note on pesticides **07**
- OR

- Q.3** (a) What is the environmental significance of Dissolved oxygen? **07**
- (b) Explain hydroxide alkalinity. Discuss situations of pH change that involve  $\text{CO}_2$  –alkalinity –pH relationship. **07**

- Q.4** (a) Write short note on composition of soil **07**
- (b) Explain how integrated nutrient management helps in control of soil pollution **07**
- OR

- Q.4** (a) Explain electrical methods of analysis and discuss in detail potentiometric analysis. **07**

- Q.4** (b) Discuss amelioration of soil acidity **07**

- Q.5** (a) What is BOD. Discuss dilution method of its measurement **07**
- (b) What is chlorine demand? Discuss DPD method for free and combined chlorine residuals **07**
- OR

- Q.5** (a) Discuss Mohr method for chloride determination. State applications of chloride data. **07**

- (b) Write short note on Gas chromatography-mass spectroscopy **07**

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