

GUJARAT TECHNOLOGICAL UNIVERSITY
ME Semester –I Examination Feb. - 2012

Subject code: 711702N

Date: 13/02/2012

Subject Name: Environmental Chemistry

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) Attempt the following **07**
- (i) How biochemical pesticides work? **02**
- (ii) Differentiate “apparent” colour and “true” colour. **02**
- (iii) How does first order reaction kinetics find application in environmental chemistry? **02**
- (iv) Enlist membrane processes showing solute size range in μm . **01**
- (b) What are applications of electrochemistry in environmental engineering? Discuss electrochemical cell. **07**
- Q.2** (a) Show the schematic diagram of a gas chromatography. Explain the functions of its components. **07**
- (b) Discuss genetically engineered microbes in bio-treatment of wastes citing examples. **07**
- OR**
- (b) (i) Why are nephelometric methods preferred over the Jackson candle turbidity meter? **02**
- (ii) What are application of turbidity data in water supply and wastewater treatment? **05**
- Q.3** (a) Write a note: Eco farming & eco technology. **07**
- (b) Write a note: Macro and micro plant nutrient. **07**
- OR**
- Q.3** (a) (i) How dialysis helpful in NaOH removal from industrial waste? **04**
- (ii) The molar concentration of the major ions in a brackish groundwater supply are as following: Na^+ , 0.02; Mg^{++} , 0.015; Ca^{++} , 0.01; K^+ , 0.001; Cl^- , 0.025; HCO_3^- , 0.001; NO_3^- ; 0.02, and SO_4^{--} , 0.012. **03**
- What would be the approximate osmotic pressure difference across a semi permeable membrane that had brackish water on one side and mineral-free water on the other, assuming the temperature is 25°C ? Find minimum pressure required to balance osmotic pressure difference to yield 75 percent fresh water.
- (b) Justify-“Integrated pest management-an eco friendly approach” **07**

- Q.4 (a) (i)** 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. **04**

Time, min	% coliform bacteria remaining
0	100
10	70
20	21
30	6.3
60	0.6

- (ii) Strontium 90 (^{90}Sr) is a radioactive nuclide of public health significance and has a half-life of 29 years. How long would a given amount of ^{90}Sr need to be stored to obtain a 99.9 percent reduction in quantity? **03**

- (b) What are the effects of modern agro technology on soil? **07**

OR

- Q.4 (a)** Differentiate surface soil and subsoil. **07**

- (b) Discuss environmental significance of dissolved oxygen. Also write advantages and disadvantages of dissolved oxygen probes have over the Winkler test for DO measurement. **07**

- Q.5 (a)** What is difference between Lambert's law and Beer's law? Discuss Photoelectric colorimeter showing schematic diagram. **07**

- (b) Describe the differentiates between volumetric, colorimetric and gravimetric analyses. **07**

OR

- Q.5 (a)** Discuss enzyme reactions. **07**

- (b) (i) In what forms does nitrogen normally occur in natural Wastes? **02**

- (ii) Describe two procedures for determining total nitrogen in a water sample. **05**
