

[This question, paper contains 6 printed pages.]

1251

Your Roll No. ....

**B.Sc. (Hons.)/I**

**A**

**CHEMISTRY – Paper VI (b)**

**(Environmental Chemistry)**

*Time : 3 Hours*

*Maximum Marks : 55*

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Attempt six questions in all.*

*Question*

*No. 1 is compulsory  
while two questions each from  
Section A and B and one question from  
Section C. Use of calculator is allowed.*

1. (a) Fill in the blanks (any six)

- (i) The upper level of the saturated zone of underground water is called the \_\_\_\_\_.
- (ii) Ozone is found mainly in the \_\_\_\_\_ layer of the atmosphere.
- (iii)  $\text{NH}_4^+$  in soils is converted to  $\text{NO}_3^-$  by \_\_\_\_\_ bacteria.
- (iv) itai-itai disease is caused by \_\_\_\_\_ poisoning.

P.T.O.

(v) Gasoline blended with ethanol is known as \_\_\_\_\_.

(vi) \_\_\_\_\_ is used to remedy the problem of acidity of soil.

(vii) \_\_\_\_\_ gas was responsible for Bhopal Gas Tragedy. (1×6=6)

(b) Give one word or phrase for :

(i) The point beyond which water must be chlorinated to maintain disinfection during storage.

(ii) A microorganism used to measure the microbial quality of water.

(iii) A pollutant that remains in environment for a long time.

(iv) Small solid particles and liquid droplets in atmosphere.

(v) Any type of animal or plant material that can be converted to energy.

(vi) The medium which retains and interacts with a long-lived pollutant. (1×6=6)

(c) With the help of a neat, labeled diagram, explain the biogeochemical cycle of Nitrogen **OR** Phosphorus. (3)

## SECTION A

2. (a) Write any two differences between classical and photochemical smog. (2)
- (b) Describe any one method of reducing particulate emissions for air pollution control. (3)
- (c) Discuss the sources and sinks of CO. What are the major ways to control CO pollution? (3)
3. (a) What is the difference in autoexhaust emission from a petrol-fueled engine and a diesel-fueled engine? (2)
- (b) Discuss the causes and effects of Ozone Layer Depletion. (3)
- (c) Describe a method for the estimation of any one of the following in an air sample
- (i)  $\text{SO}_2$
- (ii)  $\text{NO}_x$  (3)
4. (a) Explain the difference between monitoring and analysis. How can suspended particulate matter (SPM) be monitored? (3)
- (b) How is acid rain formed? Explain with chemical reactions. (3)

- (c) Suggest ways to reduce urban air pollution load. (2)

### SECTION B

5. (a) What is the main objective of sewage treatment? Describe the various processes involved in primary treatment of sewage. (3)
- (b) Other than chlorine, name any two disinfectants, used in water purification. Why is chlorine preferred over other disinfectants for municipal supplies? (2)
- (c) Give different methods of sludge digestion and elaborate any one method. (3)
6. (a) In Winkler's method of D.O. determination
- (i) What is meant by 'fixation'
- (ii) Why does  $\text{NO}_2^-$  interfere and how is it removed? (3)
- (b) What are the different techniques used for desalination of water? Elaborate any one of them. (3)
- (c) Differentiate between Eutrophic and Oligotrophic lakes. (2)

7. (a) The ultimate BOD of a waste water is 120 mg/L. How much % BOD is exerted after 5 days given that  $k = 0.28 \text{ day}^{-1}$ ? (3)
- (b) What is the role of alum in water purification? (2)
- (c) Provide brief accounts of (any two)
- (i) 'Seed' in BOD
  - (ii) Nitritotriacetic acid
  - (iii) Thiobacillus ferrooxidans
  - (iv) Fluorosis (3)

### SECTION C

8. (a) What are the factors that control soil erosion? What is the impact of soil erosion? (3)
- (b) Mention the principal renewable energy sources. Briefly explain the working of a windmill. (3)
- (c) What are the sources of polycyclic aromatic hydrocarbons (PAHs)? Also list their health and environmental effects. (2)
9. (a) What are the different sources of noise? How does noise affect human beings? (3)

- (b) Energy from biomass has a lot of promise.  
Elaborate and comment. (3)
- (c) How mercury inhibit the enzyme action? (2)