

9. (a) Discuss incineration process mentioning advantages and disadvantages.
- (b) Write short note on "Three Mile Island disaster".
- (c) Write the aspects of environment protection act in India.
- (d) What are mutagen and teratogen?

4 + 3 + 3 + 2 = 12

**ENVIRONMENT & ECOLOGY
(CHEM 2101)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Montreal protocol is related to
 (a) land pollution (b) noise pollution
 (c) production and use of CFCs (d) increase of population.
- (ii) The coldest region of the atmosphere is
 (a) troposphere (b) ionosphere
 (c) mesosphere (d) stratosphere.
- (iii) Minamata disease is associated with
 (a) mercury pollution (b) lead pollution
 (c) cadmium pollution (d) arsenic pollution.
- (iv) A lake having water with sufficient concentration of nutrients and high productivity of aquatic plants is called
 (a) oligotrophic lake (b) mesotrophic lake
 (c) eutrophic lake (d) none of the above.
- (v) Incineration is a disposal method of
 (a) solid waste (b) air pollutants
 (c) water pollutants (d) none of these.
- (vi) The Bhopal gas tragedy occurred in
 (a) 1984 (b) 1982
 (c) 1981 (d) 1985.
- (vii) The main pathogen present in contaminated water is
 (a) bacteria (b) algae
 (c) protozoa (d) all of the above.

- (viii) Human ear frequency response is related to the network
 (a) dBA (b) dBB
 (c) dBC (d) none of these.
- (ix) Grazing food chain always starts with
 (a) producers (b) primary consumers
 (c) decomposers (d) waste matters.
- (x) The main attribute of population growth is
 (a) birth rate (b) immigration rate
 (c) emigration rate (d) none of these.

Group - B

- 2 (a) What do you mean by biodiversity hotspot? Give example.
 (b) Briefly discuss about nitrogen cycle showing schematic diagram.
 (c) Exemplify renewable and non-renewable resources.
 (d) World population in 1850 was estimated to be about 1 billion. It reached 4 billion in 1975. Use exponential growth rate equation to find out growth rate constant and also calculate the doubling time value.

$$(2 + 1) + 4 + (1 + 1) + 3 = 12$$

3. (a) Write the definitions and examples of three types of food chains.
 (b) What is doubling time of population? Prove that doubling time of population $t_d = 70/R(\%)$ where R is the population growth rate constant.
 (c) Give a brief account of sulphur cycle with a schematic diagram.

$$(3 \times 2) + (1 + 2) + 3 = 12$$

Group - C

4. (a) What is greenhouse effect? What are the important greenhouse gases? How do the greenhouse gases function in the atmosphere?
 (b) Write short notes on: Carbon Footprint, Cyclone Separator
 (c) Write down the differences between photochemical smog and sulphurous smog.

$$(1 + 2 + 2) + (2 + 2) + 3 = 12$$

5. (a) What is acid rain? Write down the causes and effects of acid rain.
 (b) How PAN is formed?
 (c) Write short notes on: (i) Baghouse Filter, (ii) Maximum mixing depth.
 (d) Explain contaminant with example.

$$(1 + 3) + 2 + (2 + 2) + (1 + 1) = 12$$

Group - D

6. (a) What are the sources of generation of Arsenic (As) in water and its biochemical effects?
 (b) What is meant by hydraulic gradient? Why is the knowledge of hydraulic gradient required?
 (c) Write a short note on 'Oxidation Pond'.
 (d) What is human acoustics? Give a schematic path to show how sound energy travels through air to reach our brain.

$$(1 + 2) + (2 + 1) + 3 + (1 + 2) = 12$$

7. (a) What is the necessity of BOD test for analysis of waste water sample? Suppose Ganga water has a BOD₅ equal to 200mg/l at 20°C. The reaction rate constant k at 20°C is 0.39/day. Find out (i) reaction rate constant at 0°C, (ii) the ultimate carbonaceous BOD (C₀) and (iii) BOD₅ at 0°C.
 (b) What is hard water? Why cannot hard water be used in boilers?
 (c) What do mean by decibel? Give its mathematical expression.
 (d) Discuss the different physiological and psychological effects of noise pollution.

$$(2 + 3) + (1 + 1) + (1 + 1) + 3 = 12$$

Group - E

8. (a) What is recycling? How can you convert waste into wealth?
 (b) Describe, in short, the "Bhopal gas tragedy".
 (c) What do you mean by energy audit? What are the objectives of energy audit/ energy management?

$$(1 + 4) + 3 + (2 + 2) = 12$$