

- (d) Write the expression of decibel (dB). What is the human detectable frequency range of sound?

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

Group – E

8. (a) Write a short note on Chernobyl Disaster.
 (b) What is cancer? How does cancer develop?
 (c) What is recycling? Discuss how some valuable products can be obtained by recycling of solid waste materials.
 (d) What is waste pile?

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

9. (a) Write short note on “Bhopal Gas Tragedy”.
 (b) Define composting process of solid waste disposal. What are the advantages of the process?
 (c) Write the aspects of ‘Environment Protection Act’ of India.
 (d) What do you mean by Energy Audit?

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

ENVIRONMENT AND 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) Ozone is a pollutant when present in
 (a) troposphere (b) stratosphere
 (c) mesosphere (d) ionosphere.
- (ii) Seed bank is one kind of
 (a) ex situ conservation (b) hot spot
 (c) artificial ecosystem (d) in situ conservation.
- (iii) Which one of the following is true for a waste water sample?
 (a) BOD = COD (b) BOD > COD
 (c) BOD < COD (d) BOD = 2×COD.
- (iv) Aircraft noise is measured by
 (a) L₁₀ (18 hours) index (b) L_eP_n
 (c) L_{eq} (d) Decibel.
- (v) N₂ and O₂ are not greenhouse gases because
 (a) they have dipole moment
 (b) they do not have dipole moment
 (c) dipole moment does not occur during vibration
 (d) none of these.
- (vi) Flow of the essential elements in an ecosystem is
 (a) unidirectional (b) cyclic
 (c) unidirectional or cyclic (d) cannot be said.

- (vii) The recommended maximum TDS concentration of fresh water according to WHO is
 (a) 1000mg/l (b) 500mg/l
 (c) 1500mg/l (d) none of these.
- (viii) Dioxin a carcinogen may be a by product during the disposal method
 (a) incineration (b) secure landfill
 (c) window composting (d) encapsulation.
- (ix) Methyl Isocyanate is a
 (a) primary pollutant (b) secondary pollutant
 (c) criteria pollutant (d) contaminant.
- (x) The Chernobyl disaster tragedy occurred in
 (a) 1984 (b) 1982
 (c) 1986 (d) 1985.

Group - B

2. (a) The increase in population from 1 million to 10 million took 200 years. For exponential growth at constant rate find out the growth rate and the doubling time.
 (b) What is endemic species to biodiversity? Give example.
 (c) Define environment. Mention the various environmental factors.
 (d) Give a brief account of phosphorus cycle showing schematic diagram.
 $(2 + 2) + (1 + 1) + (1 + 2) + 3 = 12$
3. (a) In how many categories can resources be classified? Discuss in brief.
 (b) According to logistic growth of population explain the term carrying capacity.
 (c) What do you mean by Hot spot to biodiversity? Give example.
 (d) Discuss the different types of food chain taking example. What is the significance of food chain?
 $3 + 2 + (2 + 1) + (3 + 1) = 12$

Group - C

4. (a) Show that for unit mass of air the temperature of the atmosphere fall by a rate $r = -g/C_p$. [where, r = rate of change of temperature with altitude; g = gravitational acceleration; C_p = specific heat at constant pressure]
 (b) What are effects of global warming?
 (c) Write a short note on (i) Kyoto Protocol and (ii) Cyclone separator.
 $5 + 3 + (2 + 2) = 12$
5. (a) How carbon monoxide acts as a poison for human beings?
 (b) Discuss the mechanism of ozone layer depletion.
 (c) List the main points of difference between 'London Smog' and 'Photochemical Smog'.
 (d) Write down the effects of acid rain on aquatic life.
 (e) Briefly explain the 'catalytic converter'.
 $2 + 3 + 3 + 2 + 2 = 12$

Group - D

6. (a) What do you mean by Biological Oxygen Demand? Prove the relation $BOD_t = C_0(1 - e^{-kt})$ where, all the terms have their usual significance. A waste water sample has BOD_5 at 20°C equal to 200 mg/l and its ultimate BOD is 400 mg/l. Find the BOD_5 at 35°C.
 (b) What is human acoustics?
 (c) How the loudness of a sound is expressed in terms of intensity? What are the threshold of hearing and threshold of pain in terms of sound intensity?
 $(1 + 2 + 3) + 2 + (2 + 2) = 12$
7. (a) Write down the differences between BOD and COD methods. Why it is necessary to cover the bottle with a stopper in a BOD_5 test?
 (b) What do mean by aquifer? Give a brief description of aquifer.
 (c) Explain "Oxidation Pond" for waste water treatment.