

**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) Which of the following ozone is harmful to public health?
 (a) Tropospheric ozone (b) Stratospheric ozone
 (c) Mesospheric ozone (d) Ionospheric ozone.
- (ii) Which one is not a green house gas?
 (a) Water vapour (b) Nitrogen
 (c) Carbon dioxide (d) Ozone.
- (iii) Which one is primary air pollutant?
 (a) SO₂ (b) O₃
 (c) PAN (d) HCHO.
- (iv) Sulphur cycle is
 (a) hydrologic cycle (b) gaseous cycle
 (c) sedimentary cycle (d) none of these.
- (v) Which is not an example of renewable energy source?
 (a) Solar power (b) Wind power
 (c) Hydropower (d) Fossil fuels.
- (vi) Human speech is in the range of
 (a) 20-20000 Hz (b) 2000-5500 Hz
 (c) 200-3000 Hz (d) none of these.
- (vii) Which one of the following is true for a waste water sample?
 (a) BOD > COD (b) COD > BOD
 (c) BOD = COD (d) BOD = 1/COD.

- (viii) Parasitic food chain starts with
 (a) big host (b) dead organism
 (c) green plants (d) microorganism.
- (ix) Blue baby syndrome is related to
 (a) Cl⁻ (b) NO₂⁻
 (c) NO₃⁻ (d) SO₄²⁻.
- (x) Eutrophication means
 (a) lack of nutrients in water
 (b) thermal change in water
 (c) solid waste in water
 (d) none of these.

Group - B

2. (a) Define Eco-System. Write the names of different components of Eco-System.
 (b) Briefly discuss oxygen cycle showing schematic diagram.
 (c) Show if population growth is logistic then maximum sustainable yield is obtained when population is at half its carrying capacity i.e., $N = K/2$.
 (d) What is sustainable development? What is maximum sustainable yield?
(1 + 2) + 3 + 3 + (2 + 1) = 12
3. (a) What is biodiversity? What are the different types of biodiversity present in nature? What is the importance of biodiversity?
 (b) Write about four major sources of threats to biodiversity.
 (c) Give a brief account of an aquatic ecosystem mentioning the relation among living and non living organisms.
(1 + 3 + 2) + 2 + 4 = 12

Group - C

4. (a) What is global warming? What are the effects of global warming? Why existence of life is not possible in Mars?
 (b) Why thermosphere and magnetosphere are so hot?

- (c) Why tropospheric lapse rate is reversed to that on stratospheric lapse rate?
 (d) What are the effects of ozone layer depletion?

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

5. (a) Write short notes on: (i) Catalytic converter and, (ii) Montreal protocol.
 (b) What do you understand by suspended particulate? Distinguish between photochemical smog and sulphurous smog.
 (c) Deduce the chemical formula of CFC-115.

$$5 + (2 + 3) + 2 = 12$$

Group - D

6. (a) What is thermal pollution? How does it affect the environment?
 (b) What is the difference between BOD and COD methods? A waste water sample has a BOD₅ equal to 200 mg/l and ultimate BOD of 400 mg/l. Find out the BOD reaction rate constant value.
 (c) Write the basic features of rotating biological contractor.
 (d) Calculate the intensity of 110 dB sounds (Reference intensity = 1×10^{-12} w/m²).

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

7. (a) Discuss the source and biochemical effects of Arsenic (As) pollution in water.
 (b) What is the difference between sound and noise?
 (c) Write short note on "Hydraulic gradient".
 (d) What do you mean by hardness of water? Why hard water cannot be used in laundries and boilers?

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

Group - E

8. (a) Write a short note on landfill. Write its advantage and disadvantage.
 (b) What is recycling? How will you convert waste to wealth?
 (c) What is energy audit? Write two objectives of energy management.

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

9. (a) Discuss the major sources of land pollution.
 (b) Write short note on Chernobyl disaster.
 (c) What do you mean by green chemistry? How will it help to decrease environmental pollution?
 (d) Write down the differences between Environmental Auditing (EA) and Environmental Impact Assessment (EIA)

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