Group - E

8. (a) What are the teratogens? Give examples.

   (b) Write short note on "Bhopal gas tragedy".

   (c) Write short notes on surface impoundment and waste pile

   (d) What is MSW? Classify the different types of MSW mentioning examples.

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

9. (a) What do you mean by green building?

   (b) How can toxicity of Cr^{6+} be removed using chemical treatment?

   (c) Differentiate between pyrolysis and gasification?

   (d) What are the main objectives of the Environment (Protection) Act, 1986 of India?

   (e) Discuss incineration process mentioning advantage and disadvantage.

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

BASIC ENVIRONMENTAL ENGINEERING & ECOLOGY
(CHEM 2001)

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) The temperature range of troposphere is
   (a) -2°C to -92°C (b) 15°C to -56°C
   (c) -56°C to -2°C (d) -92°C to 1200°C .

   (ii) Biosphere reserve is one kind of
   (a) ex situ conservation (b) hot spot
   (c) artificial ecosystem (d) in situ conservation.

   (iii) The coenzyme responsible for conversion of mercury to methyl mercury is
   (a) vitamin B_{12} (b) vitamin C
   (c) vitamin D (d) vitamin E.

   (iv) In measurement of sound pressure level (SPL), the reference pressure is taken as
   (a) 2×10^{-5} Nm^{-2} (b) 1×10^{-5} Nm^{-2}
   (c) 9×10^{-5} Nm^{-2} (d) 5×10^{-5} Nm^{-2} .

   (v) Montreal Protocol is related to
   (a) land pollution (b) water pollution
   (c) restriction on use of CFCs (d) noise pollution.

   (vi) The most important elements causing algal bloom are
   (a) N, P, K (b) C, N, P
   (c) Ca, Mg, Fe (d) Mo, Co, Cu.

(vii) Maximum sustainable yield is obtained when the population is
(a) half of the carrying capacity
(b) double of the carrying capacity
(c) two third of the carrying capacity
(d) equal to the carrying capacity.

(viii) Unit of measuring hardness is
(a) ppm (b) mol/litre (c) gm/litre (d) mol/kg .

(ix) Solid waste management involves
(a) collection of solid wastes (b) storage of solid wastes
(c) disposal of solid wastes (d) all of the above.

(x) Which of the following is not an example of renewable energy source?
(a) Solar power (b) Wind power
(c) Hydropower (d) Fossil fuels.

Group – B

2. (a) Following logistic growth of population derive the expression for logistic growth rate constant r = $(1/t^*)Ln(K/N_0-1)$, where terms have their usual meanings.

(b) What are the endemic species to biodiversity? Give example.

(c) Give one example each of symbiotic and non symbiotic bacteria involved in biological nitrogen fixation.

(d) Define environment. Mention the main factors of environment.

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

3 . (a) What do you mean by food web? Give example.

(b) Discuss the biotic and abiotic components of a terrestrial ecosystem mentioning their correlation.

(c) Define renewable and non-renewable resources with examples.

(d) Briefly discuss phosphorus cycle showing schematic diagram.

(e) Write about four major sources of threats to biodiversity.

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

Group – C

4. (a) Define lapse rate. Prove that in case of adiabatic lapse rate the rate of change of temperature decreases with altitude and is equal to -9.76°C/km.

(b) What is photochemical smog? Discuss the PAN formation showing schematic diagram.

(c) What do you mean by carbon footprint?

(d) When is ozone considered as a pollutant?

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

5. (a) How is acid rain formed? What is the effect of acid rain on aquatic life?

(b) Write short note on electrostatic precipitator.

(c) Why is tropospheric lapse rate reversed to that of stratospheric lapse rate?

(d) Why are thermosphere and magnetosphere are so hot?

(e) Deduce the chemical formula of CFC-115.

(2 + 2) + 2 + 2 + 2 + 2 = 12

Group - D

6. (a) What are pesticides? Why are they so dangerous for living organisms?

(b) What is eutrophication? How can you prevent eutrophication?

(c) What are the various processes involved in surface water treatment to make it potable? State the disadvantages of using chlorine as disinfectant.

(d) How is loudness of a sound expressed in terms of intensity? Calculate the intensity of 101dB sound. (Reference intensity = $1\times10^{-12}W/m^2$).

(1+1) + (1+2) + (2+1) + (2+2) = 12

7. (a) Write Darcy's law of groundwater flow.

(b) Discuss the sources of generation of Cadmium and its toxic effects in human body.

(c) What are oxygen demanding wastes? Give examples.

(d) Discuss the various types of physical and physiological effects of noise pollution on human beings.

(e) What is meant by noise exposure index? Give an expression mentioning the terms involved.

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