(d) What do mean by Decibel? The sound of Military Jet takeoff has the intensity of 140 dB. Is the sound tolerable to human ear? Justify your answer.

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

Group - E

8. (a) Write a short note on "Chernobyl Disaster".

(b) Write the differences between Environmental Impact Assessment and Environmental Audit.

(c) What do you mean by promoter of cancer? Give examples.

(d) Define composting process of solid waste disposal. What are the advantages of the process?

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

9. (a) Give a brief account of Environmental Impact Assessment (EIA).

(b) What is green chemistry? Exemplify green solvent and green catalyst.

(c) What are the biomedical wastes? What is the best way to dispose biomedical wastes?

(d) What is recycling? Discuss how some valuable products can be obtained by recycling of solid waste materials.

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

BASIC ENVIRONMENTAL ENGINEERING AND 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) Air pollutant which reduces oxygen carrying capacity of haemoglobin is
(a) CO (b) CO_2 (c) H_2S (d) NH_3.

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

(iii) The main constituent of London smog is
(a) carbon monoxide (b) hydrogen sulphide
(c) carbon dioxide (d) oxides of sulphur.

(iv) The environmental protection Act of India was introduced in
(a) 1980 (b) 1985 (c) 1984 (d) 1986.

(v) The atmosphere window allows wavelength of radiation in the range of
(a) 7-12 µm (b) 0-7 µm (c) 12-20 µm (d) 20-50 µm.

(vi) Denitrification means
(a) conversion of NO_2^- to NH_4^+ (b) conversion of NH_4^+ to NO_3^-
(c) conversion of NO_3^- to N_2 (d) conversion of NH_4^+ to N_2 .

(vii) BOD bottle is stoppered to
(a) remove O_2
(b) prevent further amount of O_2 to go inside the bottle
(c) allow growth of micro-organism
(d) prevent photosynthesis.

(viii) The recommended maximum TDS concentration of drinking water according to WHO is
(a) 1000mg/l (b) 500mg/l (c) 1500mg/l (d) none of these.

(ix) Aircraft noise is measured through
(a) L_{10} (18 hours) index (b) L_eP_n
(c) L_{eq} (d) None of these.

(x) Which of the following is a green solvent?
(a) Toluene (b) Dichloromehane
(c) Diethyl ether (d) Ethyl lactate.

Group - B

2. (a) Prove that for maximum sustainable yield following logistic growth of population $(dN/dt)_{max} = rK/4$, where the symbols have their usual meaning.

(b) Define ecosystem. What is the main role of decomposer and transformer in an ecosystem?

(c) Mention the various environmental factors. What do you mean by homeostatic mechanism in natural environment?

(d) Differentiate between photoautotroph and chemoautotroph.

(e) What do you mean by potentially renewable resource?

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

3. (a) Differentiate between food chain and food web.

(b) Define Bio-geochemical cycle. Briefly discuss about nitrogen cycle showing schematic diagram.

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

(d) World's population has been estimated about 1 billion in 1850 and reached 4 billion in 1975. For exponential growth at constant rate find out the growth rate and doubling time.

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

Group - C

4. (a) An air parcel at the surface has a temperature of 25°C and the dew point temperature is 20°C. Under adiabatic condition of movement

what will be the temperature at 2000 meters. DALR = -10°C/km and SALR = -8.5°C/km.

(b) How sulphurous smog is formed? What are the effects of sulphurous smog?

(c) Write a short note on (i) Catalytic converter. (ii) Cyclone separator.

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

5. (a) What is atmosphere? What are the major regions of atmosphere? Draw the temperature profile curve of the atmosphere.

(b) All gases are not greenhouse gases but only few are, explain.

(c) How did ozone hole in the Antarctica region form?

(d) Among the carbon dioxide (CO_2) and tropospheric ozone (O_3) which one act as a secondary pollutant and why?

(e) Write short note about on 'Kyoto protocol'.

(1 + 1 + 2) + 2 + 2 + 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) In a work area, the noise levels are read as 100 dBA for 3 hrs a day, 85 dBA for 2 hrs a day and 80 dBA for remaining 3 hrs a day. Predict whether this exceeds permissible limit ?

(d) What is thermal pollution in water?

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

7. (a) Write down the sources of generation of lead (Pb) in water and describe its biochemical effects.

(b) With the help of a diagram discuss 'hydraulic gradient'.

(c) Write down the basic features of 'Rotating Biological Contractor' used in secondary treatment of waste water.