VIII. Write short notes on *ANY FIVE* of the following:

  (i)   Ozone depletion
  (ii)   Eutrophiciation
  (iii)   Carboxy haemoglobin
  (iv)   Green house effect
  (v)   Hypolimnion
  (vi)   Thermocline
  (vii)   Photochemical reaction
  (viii) Wind-Rose diagram

***

M.Sc. DEGREE II SEMESTER EXAMINATION IN
ENVIRONMENTAL TECHNOLOGY
AUGUST 2002

ENVIRONMENTAL ENGINEERING

Time: 3 Hours   Maximum Marks: 50

PART - A
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

(5 x 2 = 10)

I. 1. Define Chemical Oxygen Demand. (C.O.D.)

2. What is meant by septage of a waste water treatment plant?

3. Explain the functions of a secondary settling or sedimentation tank.

4. What are the health effects of Mercuric water pollution? Cite an episode related to Mercuric pollution.

5. Explain sanitary land fill method.

6. Define tertiary treatment in waste water treatment. Explain 'Thermal' atmospheric inversion.

PART - B
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

(5 x 3 = 15)

II. 1. Explain 'Adiabatic' lapse rate using graphical representation (not to scale). What is meant by 'environmental' laspse rate?

2. Explain the process description of 'aerated lagoons' and anaerobic filters. Explain the merits and demerits of both.

(Turn over)

3. Explain the procedure adopted for waste water characteristic studies. Express the importance of preservation of samples for representative results.

4. Which is the main source of carbon monoxide (CO) from four stroke automobile engines? What are the different conditions of stability? Explain its concern in air pollution.

5.(a) Name generally monitored biological parameters under coliform group. Explain any two methods of analysis.

OR

(b) What are the different methods used for disinfection of waste water. Name four chemical agents and explain 'break point' reaction.

6. With neat line sketch explain a sewage treatment plant working on activated sludge process. Demarcate the portion designated as secondary treatment. Explain the principle of secondary treatment.

PART - C
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

$(5 \times 5 = 25)$

III. Explain the principle of operation of 'Electro static precipitator'. What are its advantages and disadvantages?
Name a few of the industrial processes where this control measure is generally employed.

IV. Explain different methods of 'safe disposal' of municipal solid waste.

V. (a) Differentiate between 'Mechanical and Effective' stack/chimney heights. What is meant by a 'buoyant' plume? Write down 'Gaussian' plume model equation $\chi(x,0,0,H)$ and $\chi(x,y,z,H)$ and mention the constituents and constants.

OR

(b) A sulphuric acid plant is using 60 tonnes per day of sulphur for manufacturing sulphuric acid. Stack/chimney height proposed by the industry is 61 metres and wind velocity here is 0.9 m/sec where as the wind velocity at ground level (GL) is 0.55 m/sec. The industry is not intending to provide air pollution control equipments. A multispeciality hospital is proposed at 3.5 Km in downwind direction. Using adequate equations find out whether the stack/chimney height proposed is sufficient, so as to restrict the G.L. concentration of sulphur dioxide within 30 microgram/Cu.m in the proposed hospital cite. Take wind velocity at stack height for calculations. $\Delta H = 21m$, $\sigma y = 101m$, $\sigma z = 19.6m$.

VI. Explain the concept of 'aerobic' attached growth concept of waste water treatment. Explain any one process working on this concept and explain its process microbiology.

VII. (a) A township has to design an activated sludge plant to treat the waste of 100000 population. The design 'volumetric loading rate' or 'organic loading rate' should be between 0.3 to 0.7 Kg BOD/m³/day. Find out the surface area of the conventional reactor assuming ideal depth. Take 45 gm/capita/day B.O.D. load.

OR

(b) Explain the principle of analysis of Biochemical Oxygen Demand and Chemical Oxygen Demand. Explain the importance of these in Environmental quality analysis.