

VIII. Write short notes on any five of the following:-

- (a) Reverse Osmosis.
- (b) Break point chlorination.
- (c) Decibel as a measurement unit.
- (d) Aerobic composting.
- (e) Photo chemical smog.
- (f) Dissolved Oxygen.
- (g) Hypolimnion.

**M.Sc. DEGREE II SEMESTER EXAMINATION IN
ENVIRONMENTAL TECHNOLOGY
MAY 2004**

ENV 2202 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. Temperature is a limiting parameter for effluent. What is its significance to the receiving water body and environment?
2. Define Chemical Oxygen Demand (C.O.D)? Explain the COD, BOD relation of a normal sewage.
3. What is meant by sludge bulking in an activated sludge plant?
4. What is Adiabatic lapse rate in meteorology?
5. What is cell residence time in the concept of activated sludge?
6. What is meant by sanitary land fill?

PART - B

(Answer ANY FIVE questions)

(All questions carry EQUAL marks)

(5 x 3 = 15)

- II. (a) Explain the principle of operation of an activated sludge plant. Name the different types of activated sludge processes. Define MLSS.
- (b) Explain the phenomenon 'INVERSION' in meteorology. With the help of neat and rough sketches explain LOFTING and FUMIGATION phenomenon in plume dispersion.
- (c) Explain the characteristics and environmental aspects of OLIGOTROPHIC and EUTROPHIC lakes?

(Turn Over)

- (d) Explaining notations, write down the Gaussian plume model equation for G.L.C.(x, 0, 0, H) and signify the importance of effective stack height in ground level concentration.
- (c) With the help of neat line sketch write down the principle of operation of Electrostatic Precipitator. Name the different types of particulate matter control devices in industrial air pollution control.
- (f) Explain the process of aerobic composting of municipal solid waste and name the different types of municipal solid waste disposal systems.

OR

- (g) Explain the method of monitoring of fresh water stream for water quality assessment. Name the important biological parameters in stream water quality assessment? Explain the sampling and preservation of dissolved oxygen for analysis.

PART - C

(Answer ANY FIVE questions)

(All questions carry EQUAL marks)

(5 x 5 = 25)

- III. A. Explain the Biochemical Oxygen Demand (B.O.D, 5 day 20°C) curve showing change in concentration against time in stream analysis. Briefly explain the laboratory analysis of B.O.D. with wet chemistry.

OR

- III. B. Design the dimensions of an aeration tank of an activated sludge sewage treatment plant to treat the sewage of 100000 persons of a city, Assume 45 gm/cap/day of B.O.D. and volumetric loading rate of 700 B.O.D. gm/m³/day for the design. Depth of the tank should be within the permissible design criteria. With an overflow rate of 30 m³/m²/day, design the surface area of the secondary sedimentation tank for the above aeration tank. Assume 150 lit/cap/day sewage.

- IV. A. With the help of line diagram explain different types of settling chambers in air pollution control. Briefly explain the procedure for monitoring of sulphur dioxide in the ambient air using a High Volume Sampler.

OR

- IV. B. Using Gaussian plume model equation find out the ground level concentration of sulphur dioxide at 4 km down wind on straight line of a power plant chimney having the following details.

Fuel used L.S.H.S. = 100000 tons/day.

(Sulphur content of L.S.H.S = 0.6%, use the equation and find out the sulphur dioxide)

Effective Stack height = 90 metres.

Atmospheric conditions = Unstable, $\sigma_y = 500\text{m}$, $\sigma_z = 700\text{m}$.

Wind speed at stack height = 0.9 metre/sec.

Wind at ground level = 0.5 metre/sec.

This power plant is not having any air pollution control equipments attached to the stack.

- V. Explain the principle of operation of any one of the attached growth aerobic waste water treatment systems. With the help of neat line sketch describe the working of an attached growth sewage treatment plant, sewage having dirt, grit, floating matter, oil and grease.

- VI. Justify the purpose of monitoring the water quality of a fresh water river which is used for industrial and domestic water supply. Which are all the important parameters to be monitored and how they are preserved before analysis?

- VII. A. Explain the importance of Ion-Exchange process in water and waste water treatment. Explain briefly the principle of operation of Ion-Exchange in water treatment.

OR

- VII. B. What are the different types of sludge treatment for the sludge from the secondary sedimentation tank of an activated sludge. Explain the principle of operation of an anaerobic sludge digester.