- Chem - Sem VIII - CBGS

18/05/2016

Q.P. Code : 729401

(3 Hours) [Total Marks : 80

N.B. : (1) Question no. **1** is **compulsory**.
(2) Attempt any **three** out of remaining **five** questions.
(3) Assume suitable **data** wherever **required** and **justify** the same.
(4) Illustrate answers with **sketches** wherever **required**.

1. (a) Discuss the design criteria for activated sludge process in detail. Derive the necessory expression for volume of aeration tank. **10**

   (b) Write short notes on :- **10**
   (i) Noise pollution. Explain its causes, consequences and abatement.
   (ii) Atmospheric stability with respect to lapse rate.

2. (a) A thermal power plant emits 868 gm/s of SO_x through a stack. Stack height 100 m and plume rise is 50m. The wind velocity is 4m/sec at effective stack height in neutral atmospheric condition. Calculate ground level SO_x concentration in the plume-centre line downwind at a distance of 4 km. Also calculate maximum ground level concentration from an elevated source. **10**
   A = 0.13 , B = 0.392 P = 0.936

   (b) The behaviour of particulate pollution in the atmosphere is influenced by their relative sizes. Explain how the size of particulate matter makes a difference. **10**

3. (a) Explain the construction and working of following :- **10**
   (i) Bag filters
   (ii) Ventury Scrubber for particulate matter.

   (b) Explain plume behaviour depending on atmospheric stability and wind turbulence. **10**

4. (a) A settling analysis performed on a dilute suspension of discrete particles yields the following data which are recorded for samples collected at the depth of one meter in a batch sedimentation column. Determine the percent removal of suspended solids in an ideal horizontal flow sedimentation tank operating at 1.4 $(m^3/min) / m^2$. **10**

Settling time (min)	0.5	1	2	4	6	8
Weight fraction remaining	0.53	0.48	0.4	0.21	0.06	0.02

   (b) Explain (i) COD test performed in lab for waste water analysis. **10**
   (ii) Adverse effects of pesticides.

[TURN OVER

5. (a) Classify various types of solid waste. List the various methods of disposal of solid waste and explain any one method in detail. **10**

   (b) Explain Trickling filters in detail. Also compare trickling filters with activated sludge systems. **10**

6. Write short notes on **any four**. **20**

   (a) Water and Air act
   (b) Limitations of Gaussian Plume Model
   (c) Eutrophication in lakes
   (d) Nitrogen cycle in biosphere
   (e) Environmental lapse rate.
