

Please check whether you have got the right question paper.

- N.B:
1. Question no 1 is compulsory.
 2. Solve any three questions from remaining five questions.
 3. Assume suitable data wherever necessary.
 4. Figures to the right indicate full marks.

1. a) A multi tray settling chamber having 7 trays, including the bottom surface, handles 5 m³/s air at 20°C. The trays are spaced 0.25 m apart and the chamber is to be 1m wide and 4m long. What is the minimum particle size of density 2000kg/m³ that can be collected with 100% efficiency? What will be the efficiency of the settling chamber if 45µm particles are to be removed? Laminar flow conditions within the chamber and no dust initially on trays may be assumed. Viscosity of gas at 20°C=1.81 x 10⁻⁵ kg/m-s **07**
- b) Define the terms a) troposphere and tropopause b) stratosphere and stratopause. Draw a graph showing variation of temperature with altitude in each of the above regions and explain why the curve appears as it does in your plot. **04**
- c) Which parameter is used to control process efficiency in activated sludge treatment. Discuss process control if sludge is wasted from i) recycle line ii) from aeration tank. Which is better for better plant control? **05**
- d) What are the adverse effects of SO₂, NO₂ and ozone on vegetation? **04**
2. a) Explain K-theory with detail equations developed by Taylor, Richardson and Roberts using concept of mixing length. **12**
- b) Explain isokinetic and nonisokinetic particulate sampling. **08**
3. a) What are the various methods employed for recovery of material from process effluent? What is its importance? Explain any three methods and its application. **08**
- b) A completely mixed activated sludge process is to be used to treat waste water flow of 500m³/hr having a soluble BOD₅ of 250 mg/l. The concentration of soluble BOD₅ escaping treatment is 10mg/l. Air is supplied to activated sludge plant at 25°C. The oxygen transfer efficiency is 12%. Assuming that the BOD₅ is 65% of the ultimate BOD, calculate the volume of air supplied to the plant.
Y= 0.5, θ_c = 6 days, K_d = 0.6d⁻¹, density of air = 1.185kg/m³ **12**
4. a) Sampling and analysis of alkalinity and suspended solids in waste water. **10**
- b) Discuss recovery and recycle methods for glass and metals in detail. **10**
5. a) Discuss in detail along with equations scrubber performance and efficiency correlation. **10**
- b) What are the various treatments for hazardous waste management? Describe any one in detail. **05**
- c) State various equations for estimation of plume rise for buoyant plumes. **05**
6. Write short notes on: **20**
 - a) Sludge volume index
 - b) Air supply and process modification in activated sludge process
 - c) Source correction methods for air pollution control
 - d) Flame photometer
