

N.B: (1) Question no. 1 is compulsory.

(2) Attempt any three questions out of five questions.

(3) Assume suitable data wherever required and state it clearly.

1. Attempt any four of the following

- What is sludge volume index? What is its significance?
- Why velocity needs to be controlled in grit chamber?
- Draw a neat sketch of traps according to shapes.
- Difference between self purification of streams and self cleansing velocity.
- Explain the importance of BOD /COD ratio.

20

2. (a) An average operating data for conventional activated sludge treatment plant is as follows :

10

Waste water flow = 35000 m³/day

Volume of aeration tank = 10900 m³

Influent BOD = 250 mg/l

Effluent BOD = 20 mg/l

Mixed liquor suspended solids (MLSS) = 2500 mg/L

Effluent suspended solids = 30 mg/l

Waste sludge suspended solids = 9700 mg/l

Quality of waste sludge = 220 m³/d

Based on the information above, determine :

- Aeration period (hours)
- Food to microorganisms ratio (F/M) (kg BOD per day/kg MLSS)
- Percentage efficiency of BOD removal
- Sludge age

(b) Explain with a neat sketch the working of trickling filter. What is the principle on which it works?

10

3. (a) Design the dimensions of a septic tank for the following data: **10**
No. of people =200
Sewage /capita/day =120 lit
Desludging period = 1 year
Length :width = 4:1
- (b) Differentiate between one pipe and single stack plumbing system with neat sketch. **10**
4. (a) Define BOD. Calculate 3 days 36°C BOD of sewage sample whose 5 days 20°C BOD is 200 mg/lit. Assume KD at 20°C as 0.1. **10**
- (b) Enlist different types of aerobic and anaerobic treatment methods. Compare oxidation pond and oxidation ditch. **10**
5. (a) Design a sewer to serve a population of 35,000; the daily per capita water supply allowance being 160 liters, of which 80 percent finds its way into the sewer. The slope available for the sewer to be laid is 1 in 600 and the sewer should be designed to carry four times the dry weather flow when running full. What would be the velocity of flow in the sewer when running full? **10**
- (b) Write a note on sludge dewatering and sketch sludge drying bed. **10**
6. Write short notes on following: **20**
- (a) Aerated lagoon
 - (b) Sewage pumping station
 - (c) Air pollution caused by automobiles and its control
 - (d) Noise pollution and control
 - (e) Sampling of sewage
