CE-441

Environmental Eng.

UPSC

Water supply : Predicting demand of water impurities	CE-241
Intake of water design, Water Treatment	CE-441
Sewerage system	CE-241
Sewerage characterstic, BOC, COD, DO	CE-441
Sewerage Treatment	CE-441
Solid Waste Eng	CE-241
Environmental pollution, Air pollution, EIA, Pollution Controls.	CE-241

GATE

Air pollution
Municipal Solid Waste
Water and Wastewater Eng.

Syllabus :—

~~Water~~

* WasteWater characterstic, Biochemical kinetics, self purfication of stream.
* Basic concept of physical, chemical, phyochemical and biological unit and processes for Wastewater treatment.
* conventional Treatment of water, aeration, Coagulation, flocculation sedimentation, filtrations and disinfaction.
* Primary Treatment of Wastewater screening, Grit supreation
* secondary Treatment of Wastewater, Principal of aerobic and anarobic biological treatment.

Various aerobic bidogical treatment Units :—

Trickling filter's, Artificial
Waste stabalizer pond, Aerated Lagon's.

Pollution & contamination :-

Designated best use of Water :- (Centeral Pollution Control board : 2019)

1. Drinking Water resource without Treatment - PH, DO, BOD
2. Irrigation - Osmosis, Boron
3. Drinking Water source with all conventional treatment.
4. Wildlife. (Non human Uses).
5. control Waste Discharge.

Primary Water Quality Critaria.

1) Amount of Dissolved O_2 , max Solubility of O_2 - 14.61 mg/l 8-9 - In normal water.

2) PH → 6.5 to 8.5

- Solubility
  14.61 - Max
  8-9 - Medium
  less than 4

3) B.O.D. (Biochemical Oxygen Demand)

Property of water in Irrigation :-

Osmosis

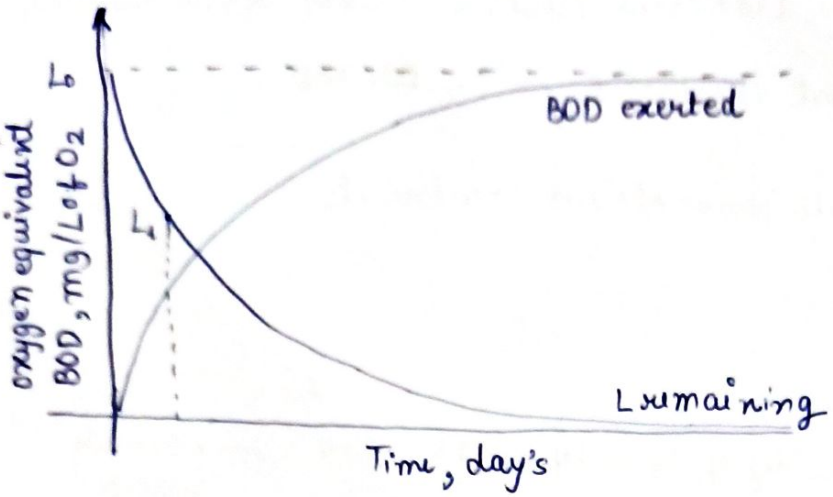
* Pure Water Goes to Impure Water.
* It Depends on Salt Concentration.
* TDS

Table 5.1 - Contaminantes.

Table 5.2 -

Primary Treatment (sedementation of filtration)
secondary Treatment (Removal of colloidal and Disolved contaminants)
Terniary Treatment (Removal of N and P)
Advanced Treatment (specific requarments)

BOD (Biochemical Oxygen Demand)



$$\frac{dL_t}{dt} = -KL_t$$

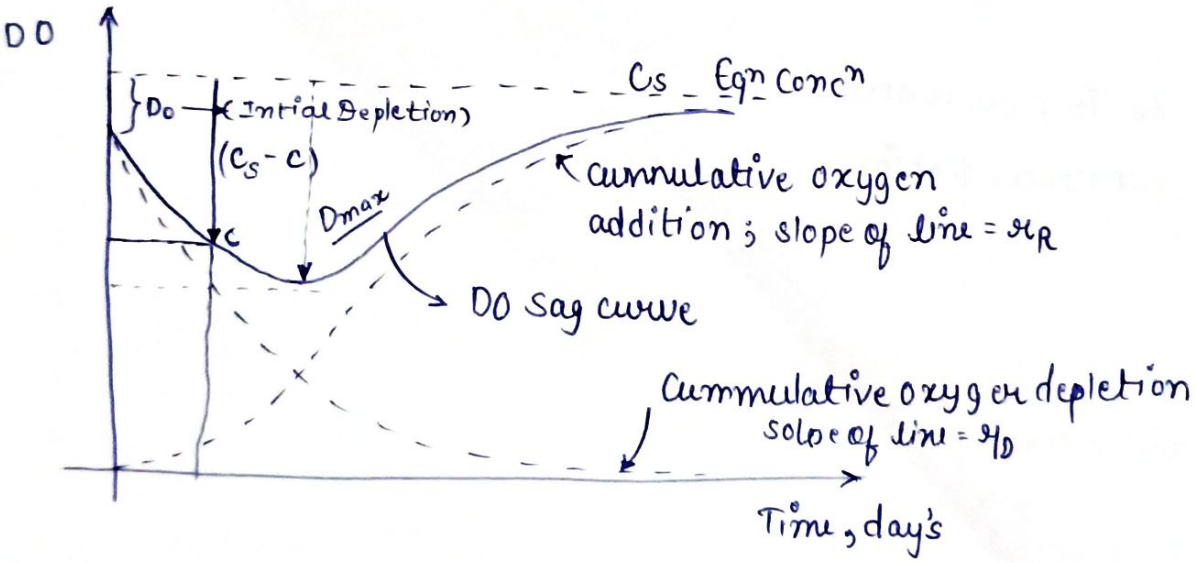
$$\int_{L_o}^{L_t} \frac{dL_t}{L_t} = \int_{t=0}^{t} -k\,dt$$

$$L_t = L_o e^{-kt}$$

y_t = BOD exerted = $L_o - L_t$

$$y_t = L_o - L_o e^{-kt}$$

$$y_t = L_o (1 - e^{-kt})$$



$$\frac{dy}{dt} = -\frac{dc}{dt}$$

$$\frac{dy}{dt} = \frac{dD}{dt}$$

$(D = C_s - c)$ ★

∵ C_s is generally constant.

★ $$\frac{dD}{dt} = K_1 L_1 - K_2 D$$

★ $$D = \frac{K_1 L_0}{K_2 - K_1} (e^{-K_1 t} - e^{-K_2 t}) + D_0 e^{-K_2 t}$$

Critical Deficit,

★ $$D_c = \frac{K_1}{K_2} L_0 e^{-K_1 t_c}$$

★ $$t_c = \frac{1}{K_1 - K_2} \ln \left[\frac{K_2}{K_1} \left(1 - D_0 \frac{K_2 - K_1}{K_1 L_0} \right) \right]$$