CE 412: Water Supply & Wastewater Disposal Systems

Quiz 2 – 2019-20 II

Q1. Consider two different wastewater treatment plants A & B receiving a daily average sewage discharge of 150 MLD and 50 MLD respectively. If the diurnal variation in sewage flow for both plants is similar, in which case the volume of the equalization tank will be more and why?

Solution: Since, the diurnal variation is similar, the flow with greater demand would require greater capacity. Therefore, tank with 150MLD discharge will have more capacity.

Q2.

Solution:

Q(ML/h)=1.5

Time	Flow(ML)	Cum. Flow(ML)	Cum. Demand(ML)	Excess Supply	Excess Demand
0	0	0	0		0
2	1.2	1.2	3		1.8
4	0.3	1.5	6		4.5
6	0.9	2.4	9		**6.6**
8	4.2	6.6	12		5.4
10	5.1	11.7	15		3.3
12	4.8	16.5	18		1.5
14	3.6	20.1	21		0.9
16	3.3	23.4	24		0.6
18	4.2	27.6	27	0.6	0
20	3.6	31.2	30	**1.2**	
22	2.7	33.9	33	0.9	
24	2.1	36	36	0	

(i) Storage Capacity = 1.2+6.6=**7.8 ML**

(ii) Tank filled during **6-20 hours.** (Since, the rate of demand is less than the rate of supply.)

(iii) Tank emptied during **20-24 hours and 0-6 hours OR 20-6 hours.** (Since, the rate of demand is greater than the rate of supply.)

(iv) In case of online HP=Q*ρgh, Q=1.5*(10^3)/3600 = 0.416 cubic m/sec , h=15 m

HP=61249.02 Watt = **82 HP**

(v) In case of offline HP=Q'*ρgh, Q'=Q-0.1*Q=0.9*1.5*(10^3)/3600 = 0.374 cubic m/sec , h=15 m

HP= **73.8HP**