

**1.85 WATER AND WASTEWATER TREATMENT ENGINEERING
HOMEWORK 3 – DUE MARCH 3, 2005**

Question 1 (6 points)

A wastewater was tested in a settling column test with the following results in terms of suspended sediment concentration:

At t = 30 minutes		At t = 60 minutes		At t = 90 minutes	
Depth below surface, h (cm)	Concentration remaining, c/c_0	Depth below surface, h (cm)	Concentration remaining, c/c_0	Depth below surface, h (cm)	Concentration remaining, c/c_0
38	0.23	34	0.05	32	0.03
118	0.81	114	0.46	112	0.23
198	0.94	194	0.73	192	0.52
278	0.97	274	0.86	272	0.70
358	0.98	354	0.92	352	0.83

- What type of settling is indicated by these data? (2 points)
- This particular wastewater is proposed to be treated in a rectangular sedimentation tank having a detention time of 2 hours and a depth of 4 meters. Estimate the percent of suspended sediments that will be removed. (2 points)
- If the wastewater flow rate is $7,500 \text{ m}^3/\text{day}$, what needs to be the area and volume of the sedimentation tank? (2 points)

Question 2 (2 points)

Viessman and Hammer Problem 10.15. Two rectangular clarifiers, each 30 ft. long, 15 ft. wide, and 10 ft. deep, settle 0.40 mgd following alum coagulation. The effluent channels have a total weir length of 60 ft. Calculate the detention time, horizontal velocity of flow, and rate of flow over the outlet weir in gpd per foot of weir length). Do these values meet the Recommended Standards for Water Works given in Section 10.13?

Question 3 (2 points)

Viessman and Hammer Problem 10.20. A rectangular sedimentation basin is to be designed for a flow of 1.0 mgd (million gallons per day) using a 2:1 length:width ratio, an overflow rate of 0.00077 fps (feet per second), and a detention time of 3.0 hr. What are the dimensions of the basin?