

CT4471-OCW DRINKING WATER TREATMENT 1 (2006-2007) (4383-2006OCW) > CONTROL PANEL > PREVIEW ASSESSMENT: SEDIMENTATION

Preview Assessment: Sedimentation

Name Sedimentation

Instructions Answer questions in small groups (2 persons). Do not hurry, you may consult your lecture notes and other sources

Multiple Attempts This Test allows multiple attempts.

Force Completion This Test can be saved and resumed later.

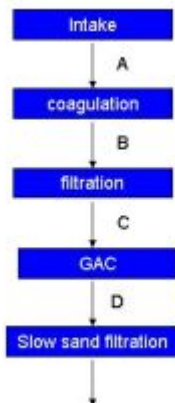
▼ Question Completion Status:

Question 1

10 points

Save

Indicate the possible locations of sedimentation in a treatment plant treating surface water from a mountain river.



- A
- B
- C
- D

Question 2

10 points

Save

Discrete, laminar settling velocity of a particle in quiescent water is only influenced by the size and the density of the particle.

- True
- False

Question 3

10 points

Save

Particle 1 has a diameter of $10\ \mu\text{m}$ and particle 2 has a diameter of $20\ \mu\text{m}$, the density of both particles is the same. The settling velocity of particle 2 is under laminar conditions 4 times the settling velocity of particle 1.

- True
- False

Question 4

10 points Save

When temperature decreases from 20 °C to 10 °C, the particle diameter has to be increased with a factor 1.3 to obtain the same laminar settling velocity.

- True
- False

Question 5

10 points Save

The efficiency of discrete, laminar settling in a horizontal flow tank under ideal conditions is only influenced by the raw water composition, the flow and the surface area of the tank.

- True
- False

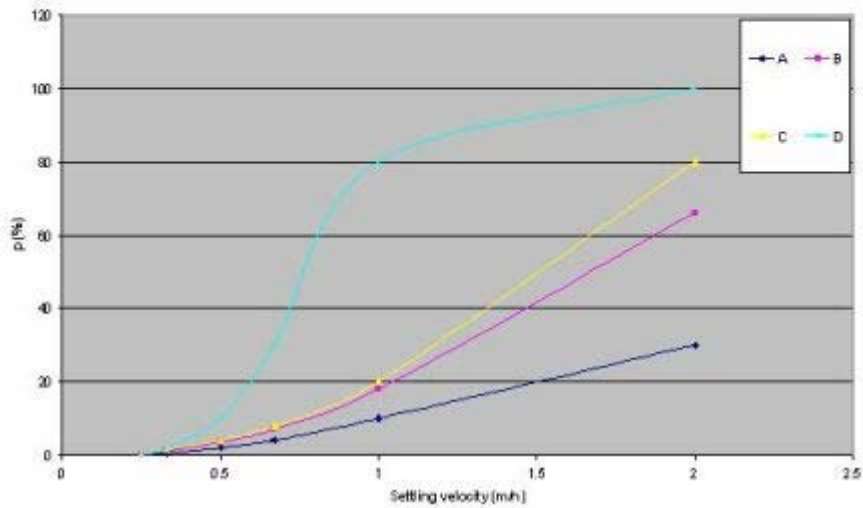
Question 6

10 points Save

Indicate which of the cumulative frequency distributions is the correct one, taking into account the results of the settling test (see picture).

h = 0.5 m							
t [sec]	0	900	1800	2700	3600	5400	7200
C [ppm]	86	57	16	6	3	1	0
C/C₀ [%]	100	66	18	7	3.5	1	0

Cumulative frequency distribution

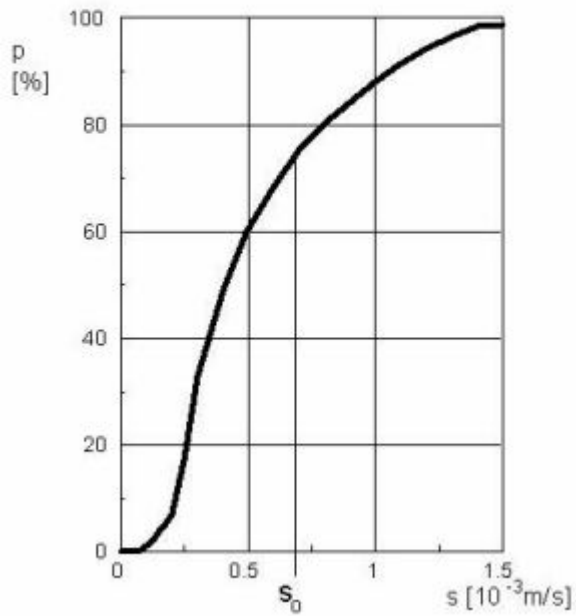


- A
- B
- C
- D

Question 7

10 points Save

What is the removal efficiency of a vertical flow tank, assuming ideal conditions, discrete settling and a surface loading of s_0 .

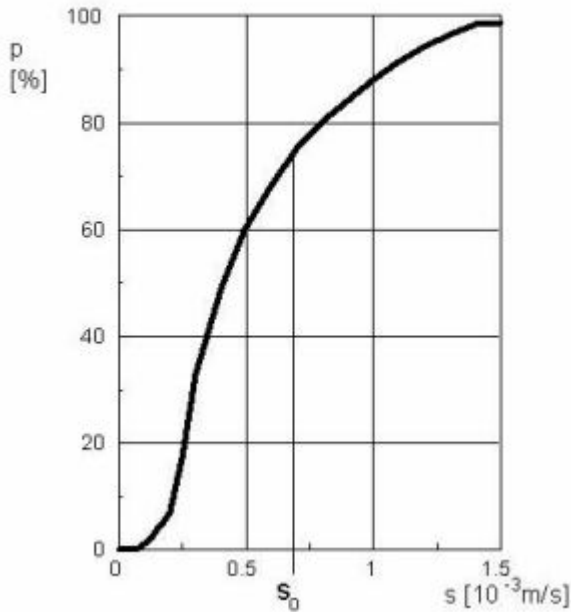


- 25%
- 37%
- 63%
- 75%

Question 8**10 points**

Save

What is the removal efficiency of a vertical flow tank, assuming ideal conditions, discrete settling and a surface loading of s_0 .



- 25%
- 37%
- 63%
- 75%

Question 9

10 points

Save

Floc removal is executed in a horizontal flow settling tanks, divided into three lanes. The dimensions of one lane are: $L = 200$ m, $W = 20$ m, $H = 1.5$ m

The design capacity of the settling tank is 6000 m³/h. The water company is evaluating the possibilities of increasing the capacity to 8000 m³/h. Some possible scenarios are:

- no alternations in the existing settling tank
- increase the depth of all lanes to 2.5 m
- increase the length of all lanes to 300 m
- increase the number of streets to 4 (width=20 m)

Match the characteristics of the four scenarios compared to the existing situation

- no alternations in the existing settling tank
- increase the depth of all lanes to 2.5 m
- increase the length of all lanes to 300 m
- increase the number of streets to 4 (width=20 m)

- A. Same removal efficiency, increased stability, increased turbulence
- B. Decreased removal efficiency, increased stability, increased turbulence
- C. Same removal efficiency, same stability, same turbulence
- D. Decreased removal efficiency, same stability, same turbulence

Question 10**10 points**

Save

The performance of a horizontal settling tank with a horizontal baffle is equal to the performance of a horizontal settling tank with a vertical baffle.

- True
- False

Question 11**10 points**

Save

A horizontal flow settling tank with low Camp number ($< 10^{-5}$) can have short circuiting problems.

- True
- False

Question 12**10 points**

Save

A vertical baffle is placed in a horizontal flow settling tank. Indicate what happens to the removal efficiency, Camp number and Reynolds number.

- | | | |
|---|--------------------|-----------|
| <input type="text"/> - <input type="text"/> | Removal efficiency | A. Higher |
| <input type="text"/> - <input type="text"/> | Froude number | B. Lower |
| <input type="text"/> - <input type="text"/> | Reynolds number | C. Equal |

Question 13**10 points**

Save

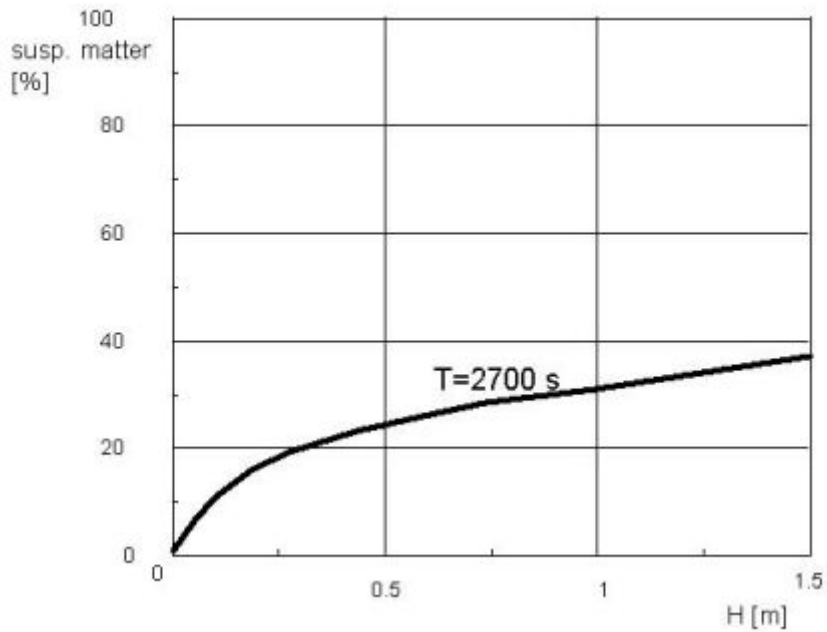
Turbulence has a negative influence on both discrete settling and flocculent settling.

- True
- False

Question 14**10 points**

Save

The efficiency of a horizontal flow tank where flocculent settling occurs is dependent on depth and time. What is the removal efficiency for a depth of 1.5 m after a residence time of 2700 sec (see figure)?



- 25%
- 37%
- 63%
- 75%

Question 15**10 points**

Save

In a tilted plate settling tank the flow is more stable and less turbulent than in a horizontal settling tank of the same size.

- True
- False

Question 16**10 points**

Save

The surface loading of a counter-current tilted plate settler with the following characteristics:

$$H = 1\text{ m}; w = 4\text{ cm}; t = 5\text{ mm and } \alpha = 60^\circ$$

is a factor 20 smaller than the surface loading of a horizontal flow settling tank with the same dimensions.

- True
- False

Save

Submit

