Test Canvas

Add, modify, and remove questions. Select a question type from the Add Question drop-down list and click **Go** to add questions. Use Creation Settings to establish which default options, such as feedback and images, are available for question creation.

Add | Calculated Formula | GO | Creation Settings

|	
Name	Sedimentation
Description	Questions about Sedimentation of CT4471 Drinking Water Supply 1.
Instructions	Answer questions in small groups (2 persons). Do not hurry, you may consult your lecture notes and other sources

Modify

◀ Add Question Here

Question 1 ▼   **Multiple Answer**   **10 points**   Modify   Remove

Question Indicate the possible locations of sedimentation in a treatment plant treating surface water from a mountain river.
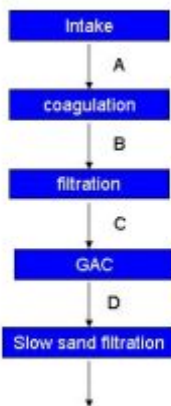
Answer
✓ A
✓ B
  C
  D

Correct Feedback	Mountain rivers have during rain storms high contents of suspended solids. Discrete pre-settling can be applied to reduce the suspended solids concentration. After coagulation and floc removal sedimentation is needed to avoid rapid clogging of the rapid sand filters.
Incorrect Feedback	Mountain rivers have during rain storms high contents of suspended solids. Discrete pre-settling can be applied to reduce the suspended solids concentration. After coagulation and floc removal sedimentation is needed to avoid rapid clogging of the rapid sand filters.

◀ Add Question Here

Question 2 ▼   **True/False**   **10 points**   Modify   Remove

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

Answer
  True
✓ False

Correct Feedback	Also temperature influences the settling velocity.
Incorrect Feedback	Also temperature influences the settling velocity.

| Question 3 ▾ | **True/False** | **10 points** | Modify | Remove |

Question

Particle 1 has a diameter of 10 μm and particle 2 has a diameter of 20 μm, 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.

Answer
✔ True
False

Correct Feedback   Following Stokes' law, the laminar settling is dependent on d^2.

Incorrect Feedback   Following Stokes' law, the laminar settling is dependent on d^2.

| Question 4 ▾ | **True/False** | **10 points** | Modify | Remove |

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

Answer
True
✔ False

Correct Feedback   The diameter of the particle has to be increased with a factor $\sqrt{1.3}$.

Incorrect Feedback   The diameter of the particle has to be increased with a factor $\sqrt{1.3}$.

| Question 5 ▾ | **True/False** | **10 points** | Modify | Remove |

Question 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.

Answer
✔ True
False

Correct Feedback   Raw water composition determines the distribution of settling velocities and flow and surface area determine surface loading (s_0).

Incorrect Feedback   Raw water composition determines the distribution of settling velocities and flow and surface area determine surface loading (s_0).
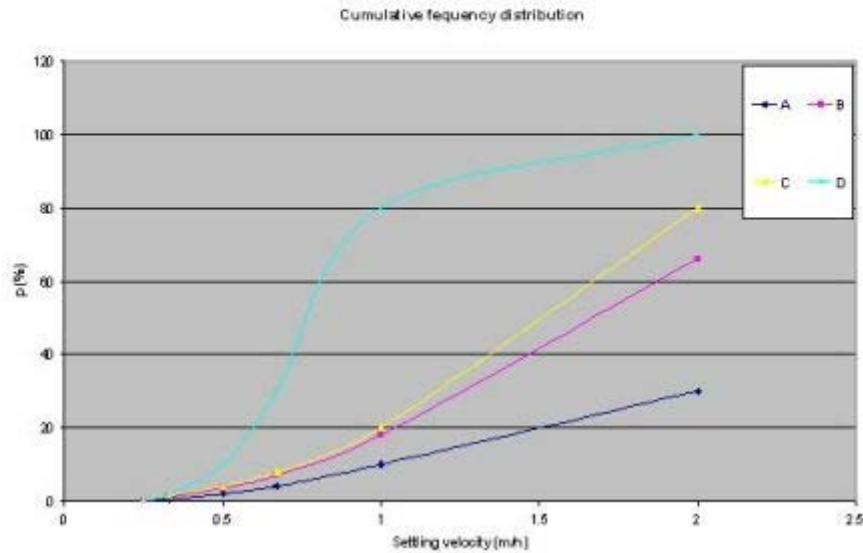
| Question 6 ▾ | **Multiple Choice** | **10 points** | Modify | Remove |

Question 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/C_0 [%]	100	66	18	7	3.5	1	0

Cumulative fequency distribution

Answer

   A

✓ B

   C

   D

|	
Correct Feedback	66% of the suspended solids have a settling velocity smaller than 2 m/h (=0.5/900 m/s). Thus B is the correct graph.
Incorrect Feedback	66% of the suspended solids have a settling velocity smaller than 2 m/h (=0.5/900 m/s). Thus B is the correct graph.

◀ Add Question Here

Question 7 ▼ **Multiple Choice**   **10 points**   Modify   Remove

Question What is the removal efficiency of a vertical flow tank, assuming ideal conditions, discrete settling and a surface loading of s_0.
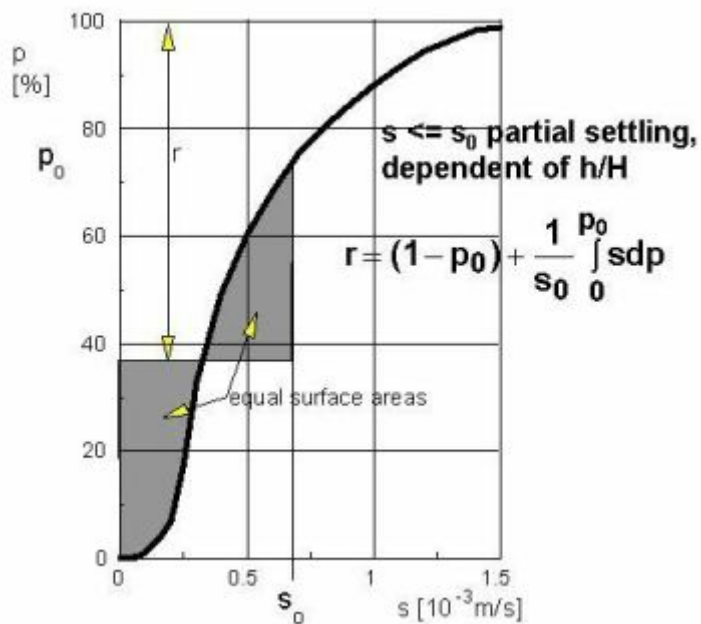
Answer   25%

              37%
        ✓   63%
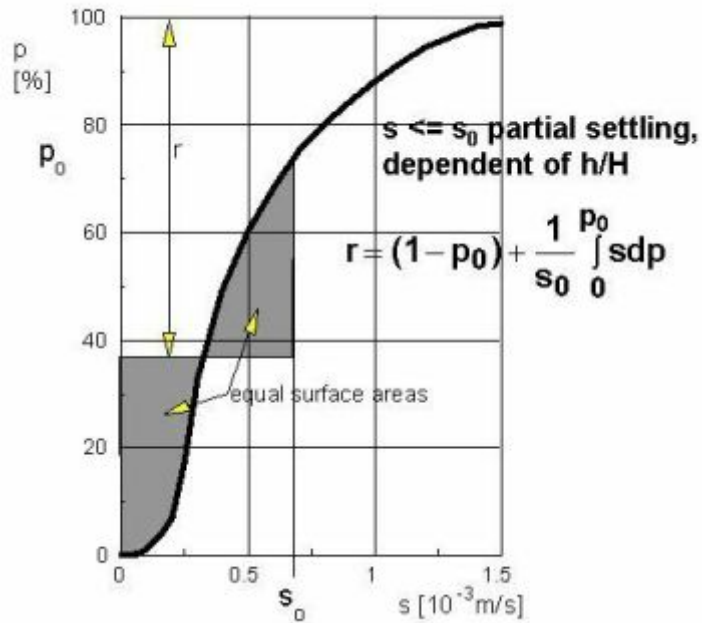   75%

Correct Feedback   All particles with a settling velocity of more than surface loading (s_0) will be removed and part of the particles that have a lower settling velocity (see picture). Thus 63% of the particles are removed.

$$r = (1 - p_0) + \frac{1}{s_0} \int_0^{p_0} s\,dp$$

s <= s_0 partial settling, dependent of h/H

equal surface areas

Incorrect Feedback   All particles with a settling velocity of more than surface loading (s_0) will be removed and

part of the particles that have a lower settling velocity (see picture).Thus 63% of the particles are removed.

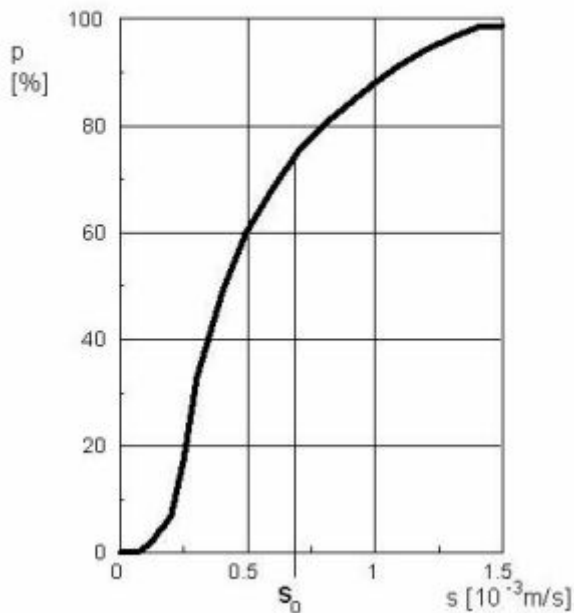| Question 8 ▼ | **Multiple Choice** | **10 points** | Modify | Remove |

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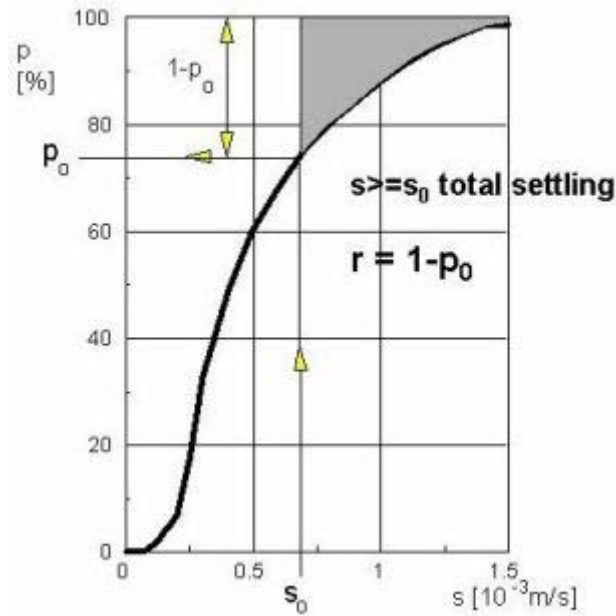

Answer   ✓

25%

37%

63%

75%
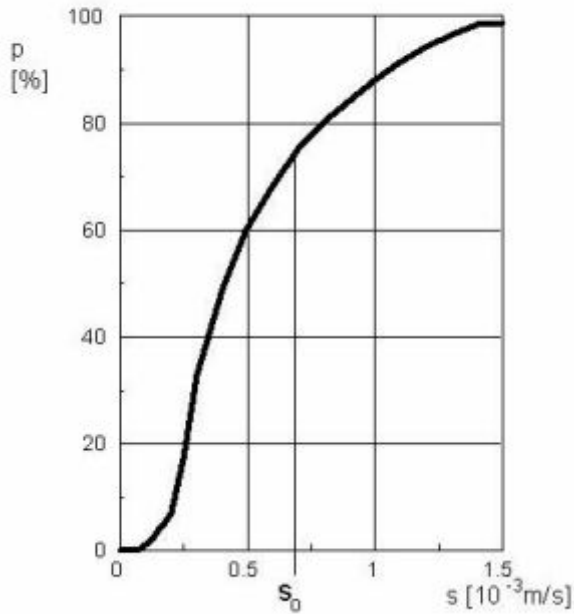
Correct Feedback

All particles with a settling velocity of more than surface loading (s_0) will be removed. Thus 25% of the particles are removed.

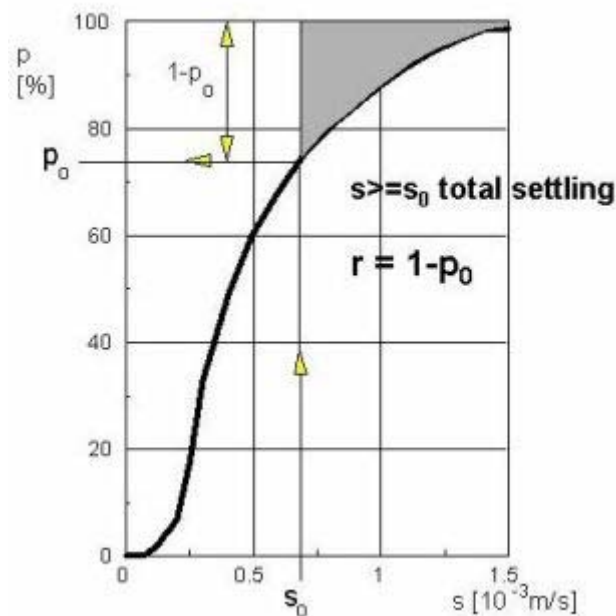**Incorrect Feedback**

All particles with a settling velocity of more than surface loading (s_0) will be removed. Thus 25% of the particles are removed.

Add Question Here

Question 9   **Matching**   **10 points**   Modify   Remove

Question
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 m^3/h. The water company is evaluating the possibilities of increasing the capacity to 8000 m^3/h. Some possible scenario¿s 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 scenario¿s compared to the existing situation

Answer	Match Question Items	Answer Items
B. -	A. no alternations in the existing settling tank	A. Same removal efficiency, increased stability, increased tubulence
D. -	B. increase the depth of all lanes to 2.5 m	B. Decreased removal efficiency, increased stability, increased tubulence
A. -	C. increase the length of all lanes to 300 m	C. Same removal efficiency, same stability, same tubulence
C. -	D. increase the number of streets to 4 (width=20 m)	D. Decreased removal efficiency, same stability, same tubulence

◀ Add Question Here

| Question 10 ▾ | **True/False** | **10 points** | Modify | Remove |

Question 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.

Answer	True
	✔ False
Correct Feedback	In a horizontal flow settling tank with a horizontal baffle the surface loading is half the original surface loading, so the efficiency of settling is increased. This is not the case when a vertical baffle is placed.
Incorrect Feedback	In a horizontal flow settling tank with a horizontal baffle the surface loading is half the original surface loading, so the efficiency of settling is increased. This is not the case when a vertical baffle is placed.

◀ Add Question Here

| Question 11 ▾ | **True/False** | **10 points** | Modify | Remove |

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

Answer	✔ True
	False
Correct Feedback	A low Camp number induces an instable flow that can be influenced by wind, forming eddies and diminishing the effective surface area of the tank.
Incorrect Feedback	A low Camp number induces an instable flow that can be influenced by wind, forming eddies and diminishing the effective surface area of the tank.

◀ Add Question Here

| Question 12 ▾ | **Matching** | **10 points** | Modify | Remove |

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

Answer   Match Question Items   Answer Items

C. - A. Removal efficiency A. Higher

A. - B. Froude number   B. Lower

C. - C. Reynolds number C.

Equal

Correct Feedback   Hydraulic radius decreases (R=BH/(B+4H) instead of R=BH/(B+2H)) and there fore Camp number increases (more stable flow) and Reynolds number decreases (less turbulent flow). Removal efficiency is dependent on surface loading (Q/BL) and remains the same.

Incorrect Feedback   Hydraulic radius decreases (R=BH/(B+4H) instead of R=BH/(B+2H)) and there fore Camp number increases (more stable flow) and Reynolds number decreases (less turbulent flow). Removal efficiency is dependent on surface loading (Q/BL) and remains the same.

◀ Add Question Here

| Question 13 ▼ | **True/False** | **10 points** | Modify | Remove |

Question

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

Answer
    True
    ✓ False

Correct Feedback   Turbulence has a negative influence on discrete settling, but a positive influence on flocculent settling, because it promotes collisions of primary flocs.

Incorrect Feedback   Turbulence has a negative influence on discrete settling, but a positive influence on flocculent settling, because it promotes collisions of primary flocs.

◀ Add Question Here
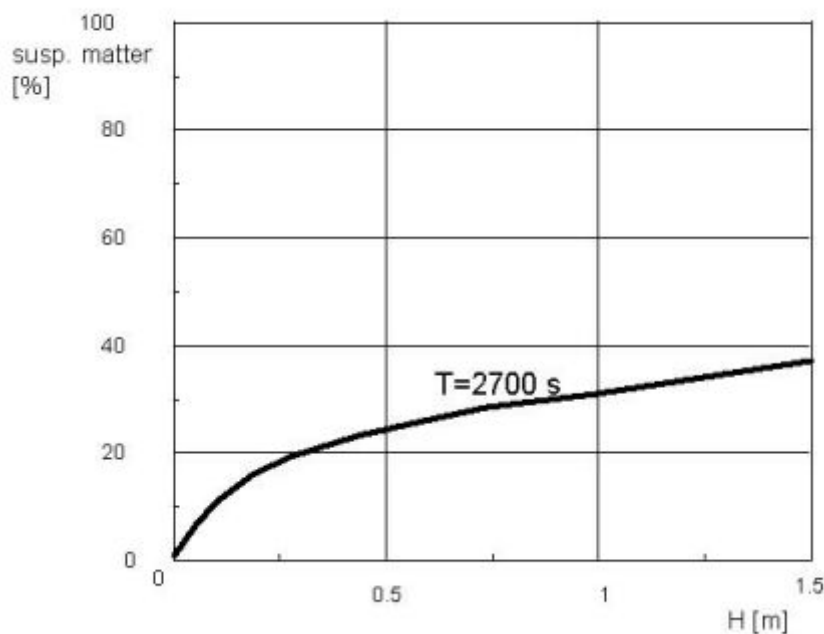
| Question 14 ▼ | **Multiple Choice** | **10 points** | Modify | Remove |

Question

The efficiency of a horizontal flow tank were 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)?
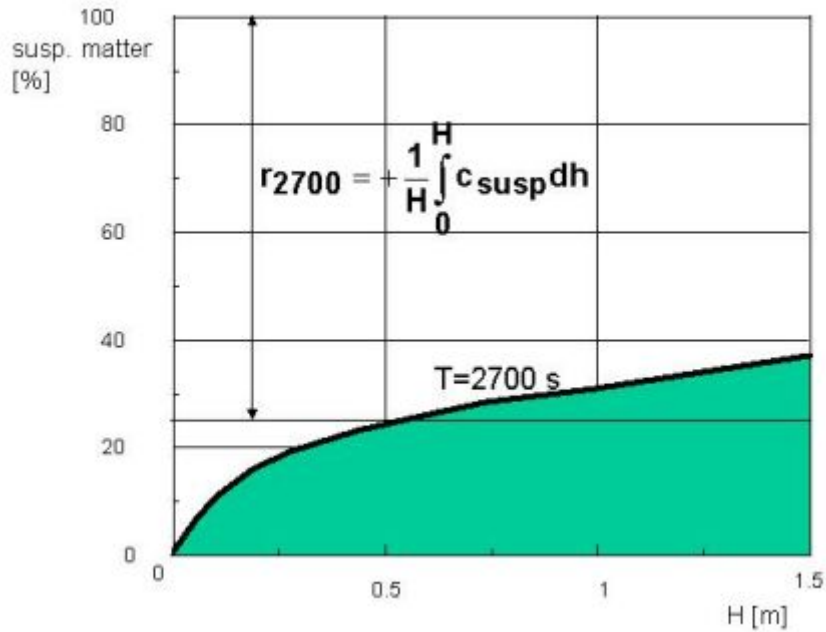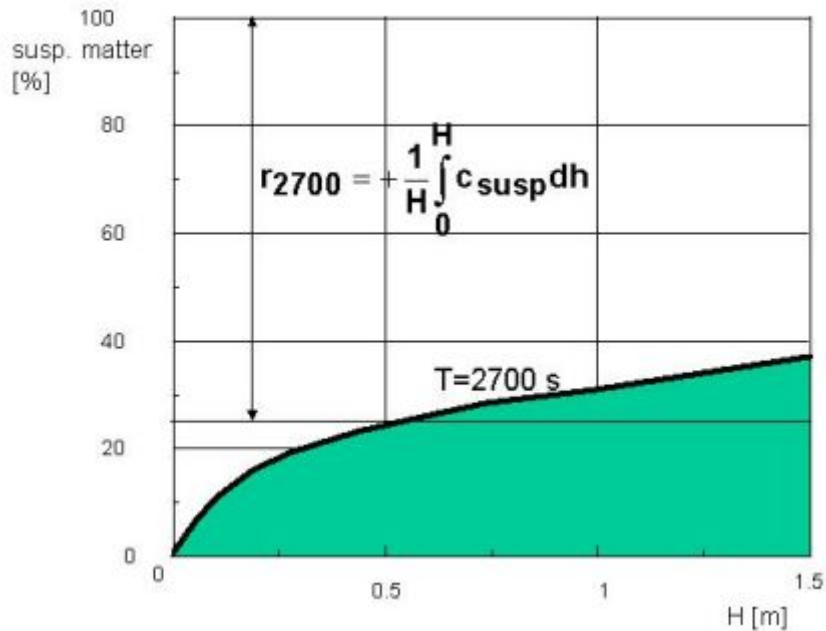

Answer

25%

37%

63%

✓

75%

Correct Feedback   The surface under the line of the graph is not removed and that is approx. 25%, so the correct answer is 75% removal efficiency.

Incorrect Feedback   The surface under the line of the graph is not removed and that is approx. 25%, so the correct answer is 75% removal efficiency.

◀ Add Question Here

Question 15 ▼   **True/False**   **10 points**   Modify   Remove

Question In a tilted plate settling tank the flow is more stable and less turbulent than in a

horizontal settling tank of the same size.

Answer   ✔ True
                    False

Correct Feedback   The Hydraulic radius decreases, so the Reynolds number decreases and the Camp number increases.

Incorrect Feedback   The Hydraulic radius decreases, so the Reynolds number decreases and the Camp number increases.

◀ Add Question Here

| Question 16 ▾ | **True/False** | **10 points** | Modify | Remove |

Question

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

H = 1m; w = 4 cm; t = 5 mm and alfa = 60^0

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

Answer   True
                    ✔ False

Correct Feedback   The surface loading of a counter-current titled plate settler is a factor 24 smaller than the surface loading of a horizontal flow settling tank with the same dimensions.

Incorrect Feedback   The surface loading of a counter-current titled plate settler is a factor 24 smaller than the surface loading of a horizontal flow settling tank with the same dimensions.

◀ Add Question Here

OK