Preview Assessment: Coagulation and floc formation

Name	Coagulation and floc formation
Instructions	Answer the questions in small groups (2 persons). Think well about the answers and you are allowed to 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:

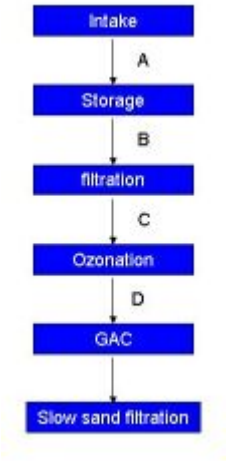
Question 1 **10 points** Save

The traditional treatment of surface water consisted of coagulant dosing, followed by floc formation-settling and rapid filtration.

- True
- False

Question 2 **10 points** Save

Indicate possible locations of coagulation in the treatment train (more answers can be possible).



- A
- B
- C
- D

Question 3 **10 points** Save

Which of the following chemicals are used as coagulants?

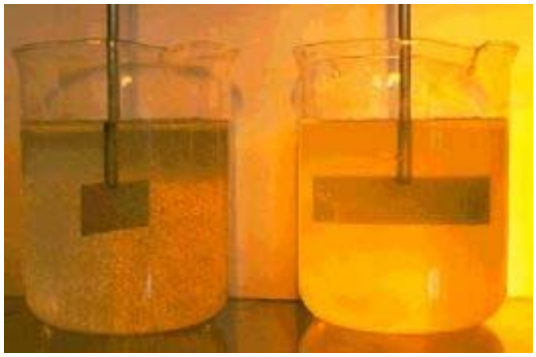
(More answers can be correct)

- $Fe_2(SO_4)_3$
- $FeCl_3$
- $Ca(OH)_2$

- [ ] NaOH
- [ ] $KMnO_4$
- [ ] $Al_2(SO_4)_3$

Question 4 **10 points** Save

Jar tests are executed to determine optimal coagulant dose, pH and coagulant aid cose.



- ( ) True
- ( ) False

Question 5 **10 points** Save

Match the coagulation mechanisms

- [-] Attachment to positive hydrolysis products
- [-] Incorporation in hydroxide flocs
- [-] Positive ions destabilise colloids

A. Sweep coagulation
B. Adsoptive coagulation
C. Electrostatic coagulation

Question 6 **10 points** Save

Match coagulation mechanisms

- [-] Low pH
- [-] High turbidity
- [-] Low turbidity

A. Sweep coagulation
B. Adsorptive coagulation
C. Electrostatic coagulation

Question 7 **10 points** Save

The following three water types are coagulated with Ferric Chloride

	Watertype A	Watertype B	Watertype C
Suspended solids	very high	low	low
Color	low	high	low
pH	8	6,5	8

Which coagulation mechanisms are involved during the coagulation of the different water types?

Water type A

- Water type B
- Water type C

A. Electrostatic coagulation
B. Adsorptive coagulation
C. Sweep coagulation

Question 8 **10 points** Save

The term "Enhanced Coagulation" is used when the purpose is to remove

- Turbidity
- Organic matter
- Pathogenic micro-organisms
- Organic micro-pollutants

Question 9 **10 points** Save

At lower temperatures coagulation can be enhanced by using higher coagulant doses, increase impeller speed and/or applying coagulant aids.

- True
- False

Question 10 **10 points** Save

With a velocity of 750 m^3/h the water is fed to two units. The coagulant is added in a cascade with a height of 0,2 m. The shear of mixing (G_c) at a temperature of 10 °C is for this situation 1500 s^{-1}. The coagulation compartment is a bit over dimensioned and therefore, if the velocity is below 500 m^3/h, only one unit is used. What is the shear at a velocity of 500 m^3/h and a temperature of 10°C (one unit in use).

- 1430
- 1530
- 1630
- 1730

Question 11 **10 points** Save

In floc formation orthokinetics is the predominant mechanism.

- True
- False

Question 12 **10 points** Save

When the temperature drops from 20 ^{0}C to 10 ^{0}C, the dissipated power of a stirring device should decrease with a factor 1.14 to obtain equal G-values.

- True
- False

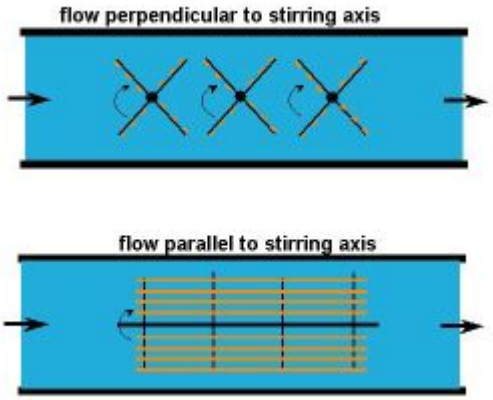
Question 13 **10 points** Save

In the production location of Berenplaat (watercompany Evides), 80 sludge blancket clarifiers (5.7x8.3x3 m) are used for a combined coagulation/flocculation/sedimentation. About 2/3 of the sludge blanket clarifier is stirred mechanically (40 W per basin). The water production is 22000 m^3/h. The G_v-value in the flocculation part of the sludge blanket clarifier is equal to 20 s^{-1}.

- True
- False

Question 14 **10 points** Save

When in a flocculation chamber the flow is perpendicular to the stirring axis less short circuiting occurs than in a chamber where the flow is parallel to the stirring axis (see figure).



- True
- False

Question 15 **10 points** Save

Assuming a G-value of 50 s^{-1}, a contact time of 10 minutes and the factor $k_a.c_v$=0.0001,

what are the concentrations of primary particles in the effluent of a plug flow and a completely stirred flocculation chamber respectively?

- 0.05 n_0 for plug flow and 0.25 n_0 for completely stirred tank reactor
- 0.05 n_0 for plug flow and 0.15 n_0 for completely stirred tank reactor
- 0.10 n_0 for plug flow and 0.25 n_0 for completely stirred tank reactor
- 0.10 n_0 for plug flow and 0.15 n_0 for completely stirred tank reactor

Question 16 **10 points** Save

During floc formation the maximum rotation speed of an impeller with a radius of 1.8 m is 5.3 rotations per minute.

- True
- False

Question 17 **10 points** Save

The picture shows the following device:

- Rapid mixer
- Mechanical mixer
- Hydraulic mixer
- Flocculent settler

Save Submit