



## 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   [Creation Settings](#)

**Name** Membrane filtration  
**Description** Questions about membrane filtration CT4471 Drinking Water Treatment 1  
**Instructions** Answer the questions in small groups (2 persons). Consultation of your lecture notes and other sources is allowed.

**10 points**

**Question** Membrane filtration can be divided into two categories based on:

- Answer**
- the length of the membrane
  - the diameter of the membrane
  - the amount of membranes
  - the pore sizes in the membrane

**Correct Feedback** Micro and ultra filtration remove colloidal substances and micro-organisms. Nanofiltration and micro-organisms but also dissolved substances like micro pollutants and ions.

**Incorrect Feedback** Micro and ultra filtration remove colloidal substances and micro-organisms. Nanofiltration and micro-organisms but also dissolved substances like micro pollutants and ions.

**10 points**

**Question** The removal of suspended solids is measured as a percentage of the feed concentration.

- Answer**
- True
  - False

**10 points**

**Question** A removal of one log unit corresponds with:

- Answer**
- 10%
  - 50%
  - 90%
  - 99%

**Correct Feedback** page 1, chapter 6

**Incorrect Feedback** page 1, chapter 6

**10 points**

**Question** MWCO is defined as the MW of spherical molecules which are 50% rejected by the membrane pc

- Answer**
- True
  - False

**Correct Feedback** 90%

Incorrect Feedback

90%

Question 5

True/False

10 points

**Question** Micro filtration does remove viruses, ultra filtration doesnot remove viruses.

**Answer** True  
 ✓ False

**Correct Feedback** Ultrafiltration does remove viruses, microfiltration doesnot remove viruses

**Incorrect Feedback** Ultrafiltration does remove viruses, microfiltration doesnot remove viruses

Question 6

Matching

10 points

**Question** In a membrane are three water streams. Match the name with the water.

Answer	Match Question Items	Answer Items
C.	- A. dirty water or raw water	A. permeate or product water
A.	- B. water passing the membrane	B. concentrate or retentate
B.	- C. water with rejected particles	C. feed water

**Correct Feedback** Page 3

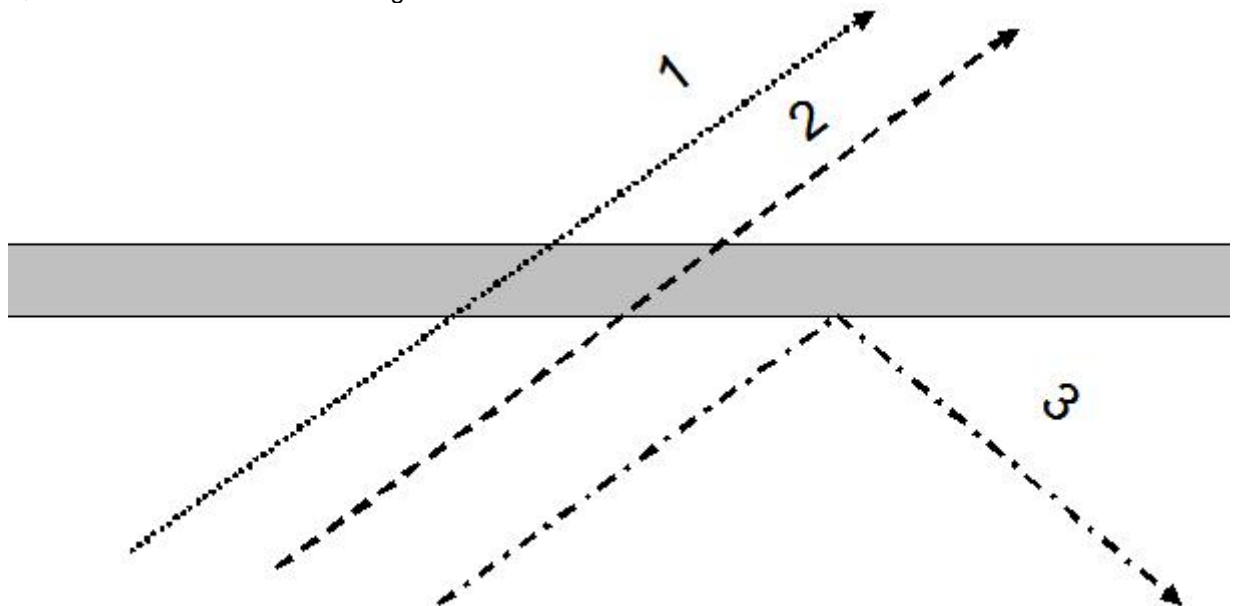
**Incorrect Feedback** Page 3

Question 7

Multiple Choice

10 points

**Question** Which water flow belongs to line 3?



**Answer**

- water
- ✓ colloids
- suspended solids

**Correct Feedback**

see figure 6.4

**Incorrect Feedback**

see figure 6.4

Question 8

Multiple Answer

10 points

**Question** Which of the following is true for dead end filtration?

- Answer**
- the water flux increases if the pressure is constant
  - the water flux decreases if the pressure is constant
  - the water flux is constant and the pressure increases
  - the water flux is constant and the pressure decreases

**Correct Feedback** see page 4

**Incorrect Feedback** see page 4

Question 9

True/False

10 points

**Question** the period of permeation is called filtration run.

- Answer**
- True
  - False

**Correct Feedback** The period of permeation is called filtration time. A filtration run is the filtration time togo

**Incorrect Feedback** The period of permeation is called filtration time. A filtration run is the filtration time togo

Question 10

True/False

10 points

**Question** With dead end filtration the recovery of a filter run is less then 100%.

- Answer**
- True
  - False

**Correct Feedback** Because the permeate is used for backwashing membranes.

**Incorrect Feedback** Because the permeate is used for backwashing membranes.

Question 11

Multiple Choice

10 points

**Question** Each degree temperature (oC) increase gives (a) (b) flux at the same pressure.

What is (a) and what is (b)?

- Answer**
- (a) 10% (b) more
  - (a) 10% (b) less
  - (a) 3% (b) more
  - (a) 3% (b) less

**Correct Feedback** see section 6.3.1

**Incorrect Feedback** see section 6.3.1

Question 12

True/False

10 points

**Question** The trans membrane pressure (TMP) is the feed pressure.

- Answer**
- True
  - False

**Correct Feedback** The trans membrane pressure is the pressure difference between permeate and feed s

**Incorrect Feedback** The trans membrane pressure is the pressure difference between permeate and feed s

Question 13

Multiple Choice

10 points

**Question** The pressure of the feed side of the MF/UF membrane is typically:

- Answer**
- 0.1 bar

- ✓ 0.5 bar
- 1 bar
- 5 bar

**Correct Feedback**  
**Incorrect Feedback**

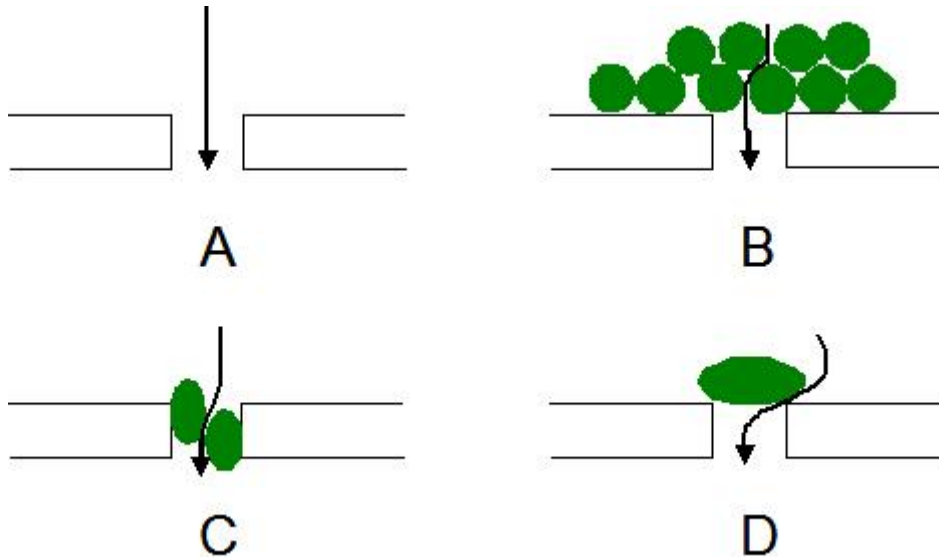
0.5 bar  
 0.5 bar

Question 14 ▾

**Matching**

**10 points**

**Question** In the figure different resistances are given. Which resistance belongs to which letter?



**Answer**

**Match Question Items**

**Answer Items**

- D. - A. pore blocking
- C. - B. adsorption in the pores
- A. - C. membrane resistance
- B. - D. cake resistance

**Correct Feedback**  
**Incorrect Feedback**

see figure 6.9  
 see figure 6.9

Question 15 ▾

**True/False**

**10 points**

**Question** When the flow has a low Reynolds number, accumulated compounds may be removed from the membrane.

**Answer** True  
 ✓ False

**Correct Feedback** The flow is turbulent for Reynolds Numbers higher than 2300. Only then accumulated compounds can be removed.  
**Incorrect Feedback** The flow is turbulent for Reynolds Numbers higher than 2300. Only then accumulated compounds can be removed.

Question 16 ▾

**True/False**

**10 points**

**Question** For forward flush applies the smaller the diameter of the membrane, the smaller the velocity need.

**Answer** True  
 ✓ False

**Correct Feedback**  
**Incorrect Feedback**

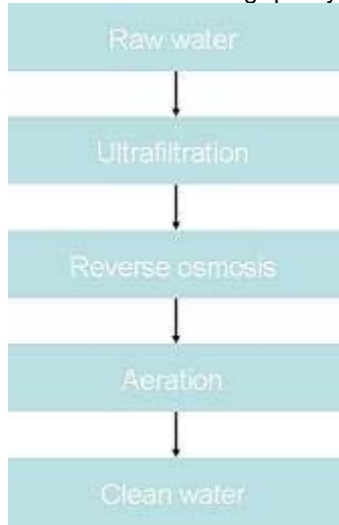
The smaller the diameter, the higher the velocity. See table 6.2  
 The smaller the diameter, the higher the velocity. See table 6.2

Question 17

Multiple Answer

10 points

**Question** An industry treats surface water to process water by means of a double membrane filtration. IN th treatment scheme is given. Which of the following quality parameters are changed after this treatment?



**Answer**

- ✓ Turbidity
- ✓ Suspended solids
- Na+
- Ca<sup>2+</sup>
- HCO<sub>3</sub><sup>-</sup>
- SO<sub>4</sub><sup>2-</sup>
- CO<sub>2</sub>
- O<sub>2</sub>
- pH
- Sum of pesticides

**Correct Feedback**

Only turbidity and suspended solids are removed.

**Incorrect Feedback**

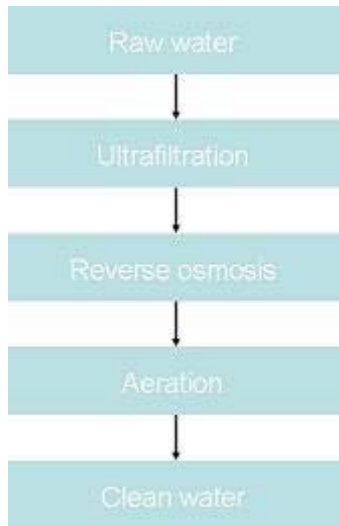
Only turbidity and suspended solids are removed.

Question 18

True/False

10 points

**Question** An industry treats surface water to process water by means of a double membrane filtration. In the treatment scheme is given. The recovery of the reverse osmosis is 80% and the recovery for the ultrafiltration is 95%. The feed flow sho



Answer

✓ True  
False

Correct Feedback

$65.8 \times 0.95 \times 0.8 = 50$

Incorrect Feedback

$65.8 \times 0.95 \times 0.8 = 50$

Question 19

Matching

10 points

Question Match.

Answer Match Question Items

Answer Items

- A. - A. The recovery of the ultra filtration is limited to 95% because A. permeate is needed t
- B. - B. The recovery of the reverse osmosis is limited to 80% because B. at higher recoveries :

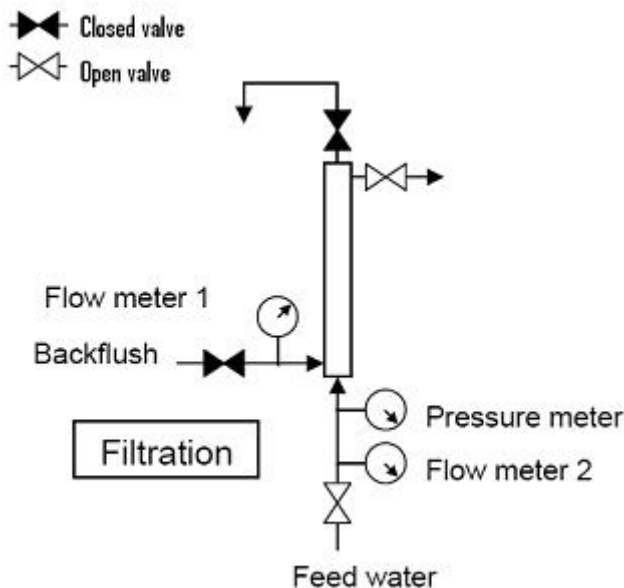
Question 20

Matching

10 points

**Question** In the ultrafiltration installation two flow meters (feed flow and backflush flow) and one pressure meter module) are installed. The permeate flows out of the module at atmospheric conditions. The permeate flux o module 615 membranes of 5.2 mm diameter are placed. The length of the module is 3 meter and the membe 30 m<sup>2</sup>.

What will the values be read on all three meter during filtration (see picture)



**Answer**

**Match Question Items Answer Items**

- B. - A. Flow meter 1 A. 0 m3/h
- A. - B. Flow meter 2 B. 3 m3/h
- D. - C. Pressure meter C. 7.5 m3/h
- D. 1 bar
- E. 2.5 bar

**Correct Feedback**

Amem = 30 m2; Qperm = Qfeed = 30\*0.1 = 3 m3/h  
 Flow meter 1: 3 m3/h  
 Flow meter 2: 0 m3/h  
 Pressure meter: 1 bar

**Incorrect Feedback**

Amem = 30 m2; Qperm = Qfeed = 30\*0.1 = 3 m3/h  
 Flow meter 1: 3 m3/h  
 Flow meter 2: 0 m3/h  
 Pressure meter: 1 bar

Question 21

**Multiple Choice**

**10 points**

**Question** Which of the sort of air bubbles in water gives the best cleaning?



**Answer**

- A
- ✓ B
- C

**Correct Feedback**

See figure 6.13

**Incorrect Feedback**

See figure 6.13

Question 22

**True/False**

**10 points**

**Question** The investments costs are minimal with modules with the highest specific surface area.

**Answer**

- ✓ True
- False

**Correct Feedback**

See section 6.5

**Incorrect Feedback**

See section 6.5

Question 23

**True/False**

**10 points**

**Question** Coagulant dosing is used to make less particles, so less particles will accumulate on the membrar

Answer True  
 ✓ False

**Correct Feedback** Coagulant is used to make larger particles not able to penetrate in the membrane and  
**Incorrect Feedback** Coagulant is used to make larger particles not able to penetrate in the membrane and

Question 24 ▾

Matching

10 points

**Question** The water is flowing through the membrane. How is it flowing? Match the arrows with the pictures

**Answer**

**Match Question Items**

**Answer Items**

B. - A.

A.



C. - B.

B.



A. - C.

C.



**Correct Feedback** See figure 7.1  
**Incorrect Feedback** See figure 7.1

Question 25 ▾

True/False

10 points

**Question** Reverse osmosis elements produce a maximum of 10% of the feed flow as permeate.



**Answer**

✔ True

False

**Correct Feedback**

see section 7.2.5

**Incorrect Feedback**

see section 7.2.5

Question 26 ▾

**True/False****10 points****Question** The osmotic pressure in the concentrate is higher than in the feed.**Answer**

✔ True

False

**Correct  
Feedback**

The feed is separated into a permeate and concentrate flow. The concentrate flow contains however these are dissolved in less water. A higher salt concentration means a higher osmo

**Incorrect  
Feedback**

The feed is separated into a permeate and concentrate flow. The concentrate flow contains however these are dissolved in less water. A higher salt concentration means a higher osmo

OK