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

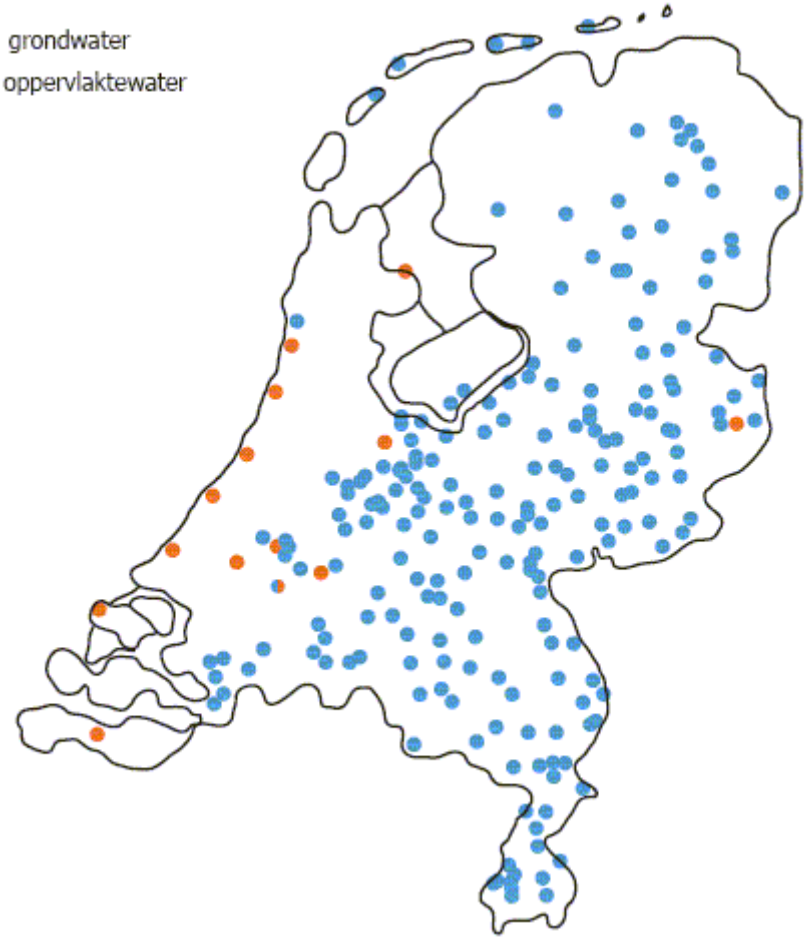
Name Introduction 2006
Description Question about Introduction in CT4471
Instructions Answer the questions using all material you wish. Please take your time and discuss with your colleagues.

Modify

Add Question Here

Question 1 **Matching** **10 points** Modify Remove

Question The map indicates the distribution of groundwater and surface water source for drinking water in the Netherlands. Which colour is for surface water? Wich colour is for ground water?



Answer

Match	Question Items	Answer Items
B. -	A. Ground water	A. Orange
A. -	B.	B. Blue

Surface water

Add Question Here

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

Question Aerobic ground water contains iron, manganese and ammonium

Answer
True
✓ False

Correct Feedback Anaerobic ground water contains the mentioned elements.

Incorrect Feedback Anaerobic ground water contains the mentioned elements.

Add Question Here

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

Question In a ground water filter 10 mg/l of iron is removed. The result is that the oxygen concentration decreases with 1.4 mg/l and the carbondioxide concentration increases with 15 mg/l.

Answer
✓ True
False

Correct Feedback See reaction equations

$4\ Fe^{2+} + O_2 + 2H_2O + 8\ HCO_3^- \rightarrow 4\ Fe(OH)_3 + 8\ CO_2$
Molecular weight: Fe:56, O_2: 32, CO_2:44
Molar ratio Fe:O_2=4:1, Fe:CO_2=4:8

10 mg Fe /l = (10/56)=0.178 mmol Fe/l
0.178 mmol Fe reacts with (0.178/4)=0.044 mmol O_2
0.044 mmol O_2 = 0.044*34=1.4 mg O_2.

Incorrect Feedback See reaction equations

$4\ Fe^{2+} + O_2 + 2H_2O + 8\ HCO_3^- \rightarrow 4\ Fe(OH)_3 + 8\ CO_2$
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10 mg Fe /l = (10/56)=0.178 mmol Fe/l
0.178 mmol Fe reacts with (0.178/4)=0.044 mmol O_2
0.044 mmol O_2 = 0.044*34=1.4 mg O_2.

Add Question Here

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

Question The treatment of riverbankfiltrate consists preferably of aeration-settling-rapidsand filtration-activated carbon filtration-UVdisinfection

Answer
True
✓ False

Correct Feedback Settling is not used after aeration

Incorrect Feedback Settling is not used after aeration

Add Question Here

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

Question In a completely mixed reservoir with a retention time of 1 month, the bacteria concentration is reduced with 99% assuming a decay coefficient of 0.3/d.

Answer
True

✓ False

Correct Feedback The correct answer is 90%.

Use rateconstant formula K2 for completely mixed reservoirs.

Incorrect Feedback The correct answer is 90%.

Use rateconstant formula K2 for completely mixed reservoirs.

Add Question Here

Question 6 **True/False** **10 points** Modify Remove

Question In the past, the traditional treatment of surface water consisted of dosing of FeCl3, followed by floc formation-settling and rapid filtration.

Answer
True
✓ False

Correct Feedback After filtration disinfection by chlorine was applied.

Incorrect Feedback After filtration disinfection by chlorine was applied.

Add Question Here

Question 7 **True/False** **10 points** Modify Remove

Question The most important advantage of artificial infiltration is the storage function.

Answer
True
✓ False

Correct Feedback The removal of pathogenic micro-organisms is the most important function of artificial infiltration.

Incorrect Feedback The removal of pathogenic micro-organisms is the most important function of artificial infiltration.

Add Question Here

Question 8 **True/False** **10 points** Modify Remove

Question Trihalomethanes are formed as by-product of disinfection with ozone.

Answer
True
✓ False

Correct Feedback Trihalomethanes are formed as by-product of disinfection with chlorine.

Incorrect Feedback Trihalomethanes are formed as by-product of disinfection with chlorine.

Add Question Here

Question 9 **True/False** **10 points** Modify Remove

Question At the "Brabantse Biesbosch" 3 reservoirs are applied in order to prevent algae blooms.

Answer
True
✓ False

Correct Feedback At the "Brabantse Biesbosch" 3 reservoirs are applied in order to prevent short circuiting.

Incorrect Feedback At the "Brabantse Biesbosch" 3 reservoirs are applied in order to prevent short circuiting.

Add Question Here

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

Question Legionnaires disease can be transmitted by drinking contaminated water.

Answer
True

✓ False

Correct Feedback Legionnaires disease can be transmitted by inhalation of aerosols.

Incorrect Feedback Legionnaires disease can be transmitted by inhalation of aerosols.

Add Question Here

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

Question Ground water is microbiologically reliable.

Answer
✓ True
False

Correct Feedback Because of the long residence time in the underground all pathogens are eliminated.

Incorrect Feedback Because of the long residence time in the underground all pathogens are eliminated.

Add Question Here

Question 12 **True/False** **10 points** Modify Remove

Question

Aeration of ground water is necessary for reducing iron.

Answer
True
✓ False

Correct Feedback No, it is necessary for oxidising iron.

In case of reducing; iron is the electron acceptor.
In case of oxidation; iron is the electron donor.

Incorrect Feedback No, it is necessary for oxidising iron.

In case of reducing; iron is the electron acceptor.
In case of oxidation; iron is the electron donor.

Add Question Here

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

Question

River bank ground water is an unreliable source for drinking water, because it is impossible to avoid pollution from reaching the wells.

Answer
True
✓ False

Correct Feedback The peaks in concentration in the surface water are strongly leveled off during soil passage.

Incorrect Feedback The peaks in concentration in the surface water are strongly leveled off during soil passage.

Add Question Here

Question 14 **True/False** **10 points** Modify Remove

Question The reservoirs applied for the treatment of surface water have 2 functions (storage, autopurification).

Answer
True
✓ False

Correct Feedback Also quality variations in the raw water source are leveled off.

Incorrect Feedback Also quality variations in the raw water source are leveled off.

Add Question Here

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

Question In a surface water treatment plant, activated carbon is necessary for removing pathogenic micro-organisms.

Answer
True
✓ False

Correct Feedback Activated carbon adsorbs organic (micro-)pollutants.

Incorrect Feedback Activated carbon adsorbs organic (micro-)pollutants.

Add Question Here

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

Question
The Vewin-benchmark is a relatively new means to promote effectiveness and makes the Dutch drinking water sector transparent and provides waterworks with instruments to improve business processes. The benchmark maps the performance of waterworks in efficiency and services. (For answering this question see www.vewin.nl)

Answer
True
✓ False

Correct Feedback The benchmark maps the performance of waterworks in efficiency, services, quality and environmental performances.

Incorrect Feedback The benchmark maps the performance of waterworks in efficiency, services, quality and environmental performances.

Add Question Here

Question 17 **True/False** **10 points** Modify Remove

Question In the Vewin bench mark, customers give waterworks reasonably high marks for service. (see www.vewin.nl).

Answer
✓ True
False

Correct Feedback Customers give waterworks reasonably high marks for service, 7.6 (out of 10).

Incorrect Feedback Customers give waterworks reasonably high marks for service, 7.6 (out of 10).

Add Question Here

Question 18 **True/False** **10 points** Modify Remove

Question Only 5% of the supllied drinking water is used for consumption. Separate water supplies with different qualities are therefore not sustainable.

Answer
✓ True
False

Correct Feedback Separate water supplies with different qualities are not sustainable, because the risk of cross connections is too high.

Incorrect Feedback Separate water supplies with different qualities are not sustainable, because the risk of cross connections is too high.

Add Question Here

Question 19 **True/False** **10 points** Modify Remove

Question The minimum treatment of anaerobic ground water is aeration.

Answer
True
✓ False

Correct Feedback Almost all ground water in the Netherlands is anaerobic and contains dissolved iron. Therefore aeration is needed to add oxygen followed by filtration to remove the formed

ironhydroxide flocs.

Incorrect Feedback Almost all ground water in the Netherlands is anaerobic and contains dissolved iron. Therefore aeration is needed to add oxygen followed by filtration to remove the formed ironhydroxide flocs.

Add Question Here

Question 20 **Multiple Answer** **10 points** Modify Remove

Question

What is the minimum treatment of ground water?

Answer

- ✓ Aeration
- ✓ Filtration
- Softening
- Adsorption
- Micro- and ultrafiltration
- Reverse osmosis and nanofiltration

Correct Feedback Almost all ground water in the Netherlands is anaerobic and contains dissolved iron. Therefore aeration is needed to add oxygen and filtration is needed to remove the formed ironhydroxide flocs.

Incorrect Feedback Almost all ground water in the Netherlands is anaerobic and contains dissolved iron. Therefore aeration is needed to add oxygen and filtration is needed to remove the formed ironhydroxide flocs.

Add Question Here

Question 21 **Multiple Choice** **10 points** Modify Remove

Question Dissolved organic compounds are removed by:

Answer

- Floc formation
- floc removal
- sand filtration
- ✓ Granular activated carbon

Correct Feedback See Section 4.1

Incorrect Feedback See Section 4.1

Add Question Here

Question 22 **True/False** **10 points** Modify Remove

Question The domestic water consumption in the Netherlands is decreasing.

Answer

- True
- ✓ False

Correct Feedback Figure 1.2 of lecture notes

Incorrect Feedback Figure 1.2 of lecture notes

Add Question Here

Question 23 **Multiple Answer** **10 points** Modify Remove

Question The drinking water in the Netherlands is of good quality. Why research on the drinking water quality is still needed?
More answers can be right.

Answer

- ✓ Drinking water quality can always be better.
- In the last years the drinking water quality has been decreased.
- ✓ The drinking water standards become more rigorous.
- ✓ There are complaints from costumers.
- Drinking water in the Netherlands is expensive. Research is needed to lower the water

price.

Correct Feedback With improving measurements techniques new compounds are discovered that must be removed from the drinking water. In addition, the water quality in the distribution network decreases due to settling of particles and after growth of micro-organisms. Complaints can occur when brown water enters the households due to resuspension or pressure drops due to clogging.

Incorrect Feedback With improving measurements techniques new compounds are discovered that must be removed from the drinking water. In addition, the water quality in the distribution network decreases due to settling of particles and after growth of micro-organisms. Complaints can occur when brown water enters the households due to resuspension or pressure drops due to clogging.

Add Question Here

Question 24 **True/False** **10 points** Modify Remove

Question The high population density in the Netherlands is one of the reasons why the Dutch water supply system is one of the best of the world.

Answer
✓ True
False

Correct Feedback Because of the high density, there are short distribution pipelines. Therefore there is a low residence time of the water in the pipe system; leakages can be controlled and sufficient pressure can be maintained, to avoid quality deterioration.

Incorrect Feedback Because of the high density, there are short distribution pipelines. Therefore there is a low residence time of the water in the pipe system; leakages can be controlled and sufficient pressure can be maintained, to avoid quality deterioration.

Add Question Here

Question 25 **True/False** **10 points** Modify Remove

Question The clear water storage must have a capacity of 6 hours to compensate the difference between day and night.

Answer
✓ True
False

Correct Feedback The required capacity is about 25% of the maximum daily consumption.

Incorrect Feedback The required capacity is about 25% of the maximum daily consumption.

Add Question Here

Question 26 **Multiple Choice** **10 points** Modify Remove

Question The drinking water demand is not constant over the day. The differences in water demand are adjusted by:

Answer
Abstraction
Treatment
✓ Storage
Distribution

Correct Feedback The water flow through the treatment plant should be more or less constant for optimal performance. Because the water demand over the day fluctuates a storage is needed to level off the variations. The storage should be at least 25% of the maximum daily water demand.

Incorrect Feedback The water flow through the treatment plant should be more or less constant for optimal performance. Because the water demand over the day fluctuates a storage is needed to level off the variations. The storage should be at least 25% of the maximum daily water demand.

Add Question Here

Question 27 **True/False** **10 points** Modify Remove

Question 1/3 of the produced drinking water in the Netherlands has ground water as a source.

Answer
True
✓ False

Correct Feedback 2/3 of the produced drinking water in the Netherlands has ground water as a source.

Incorrect Feedback 2/3 of the produced drinking water in the Netherlands has ground water as a source.

Add Question Here

Question 28 **Multiple Choice** **10 points** Modify Remove

Question How much of the drinking water had ground water as a source?

Answer
1/3
1/2
✓ 2/3
3/4

Correct Feedback See table 1.1

Incorrect Feedback See table 1.1

Add Question Here

Question 29 **True/False** **10 points** Modify Remove

Question DOC (dissolved organic carbon) is a measure for the concentration of organic micro pollutants.

Answer
True
✓ False

Correct Feedback It is a measure for the concentration of natural organic matter, which is in large concentrations (mg/l) present in drinking water. The organic micro-pollutants are present is much lower concentrations (microgrammes/l) and cannot be detected by the DOC measurement.

Incorrect Feedback It is a measure for the concentration of natural organic matter, which is in large concentrations (mg/l) present in drinking water. The organic micro-pollutants are present is much lower concentrations (microgrammes/l) and cannot be detected by the DOC measurement.

Add Question Here

Question 30 **True/False** **10 points** Modify Remove

Question Water with a concentration Na of 63 mg/l, K of 5 mg/l, Ca of 45 mg/l, Mg of 9 mg/l and Fe of 4 mg/l has a hardness of 1.5 mmol/l.

Answer
✓ True
False

Correct Feedback 1.13 mmol/l Ca and 0.37 mmol/l Mg.

Incorrect Feedback 1.13 mmol/l Ca and 0.37 mmol/l Mg.

Add Question Here

Question 31 **True/False** **10 points** Modify Remove

Question

The oxygen content of rain water at a temperature of 10oC is 9 mg/l

Answer
True
✓ False

Correct Feedback 12 mg/l

Incorrect Feedback 12 mg/l

Add Question Here

Question 32 **True/False** **10 points** Modify Remove

Question

The pH of water with a temperature of 25oC en a CO2 content of 44 mg/l and a HCO3- content of 61 mg/l is 7.35.

Answer
True
✓ False

Correct Feedback 6.45

See drinking water book, chapter water quality, section 3.5/3.6.

Incorrect Feedback 6.45

See drinking water book, chapter water quality, section 3.5/3.6.

Add Question Here

Question 33 **True/False** **10 points** Modify Remove

Question Soft water is almost always lime corrosive.

Answer
✓ True
False

Correct Feedback See Tillmans curve.

Incorrect Feedback See Tillmans curve.

Add Question Here

Question 34 **True/False** **10 points** Modify Remove

Question Ground water has in its nature not a calcium carbonate precipitating capacity.

Answer
✓ True
False

Correct Feedback Because of the long residence time the water is mostly aggresive due to the formation of carbondioxide during degradation of organic compounds.

Incorrect Feedback Because of the long residence time the water is mostly aggresive due to the formation of carbondioxide during degradation of organic compounds.

Add Question Here

Question 35 **True/False** **10 points** Modify Remove

Question Light anaerobic groundwater is preferably treated by aeration and dry filtration.

Answer
True
✓ False

Correct Feedback Aeration and rapid sand filtration, because light anaerobic groundwater does not contain large concentrations of ammonia.

Incorrect Feedback Aeration and rapid sand filtration, because light anaerobic groundwater does not contain large concentrations of ammonia.

Add Question Here

Question 36 **True/False** **10 points** Modify Remove

Question Aeration and gas transfer is normally the first treatment step during the production of drinking water from ground water or riverbank water.

Answer
✓ True
False

Correct Feedback Section 2.1
Incorrect Feedback Section 2.1

Add Question Here

Question 37 **True/False** **10 points** Modify Remove

Question

Although surface water has been in contact with air for a prolonged period, aeration and gas transfer is the first treatment step during the production of drinking water from surface water.

Answer

True
✓ False

Correct Feedback Section 2.1
Incorrect Feedback Section 2.1

Add Question Here

OK