Output 8: RPL/APL resources for Water Characteristics

Recognising Prior Learning (RPL)

Guidance: Multiple Choice

This series of **multiple-choice questions** have been designed so as there is only one possible correct and complete response. This allows prior knowledge to be established through pre-testing, using Response Tools.

Taxonomy: Subject, Bank number, Question title

Subject : WC = Water Characteristics

Banks : Questions of equal weighting asking for the same knowledge/understanding but in a different way over a range of applications.

Link to Journeyman certificate

WC is found within 3.2 – "Describe physical and chemical properties of water…."

Funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

Water Characteristics Part 1

Title: WC_Bank_- physical states

1) **In how many different physical states can water exist?**

Select the correct answer

a) 1

b) 2

*c) 3

d) 4

Title: WC_Bank_- dissolved oxygen/temp

2) **As water gets warmer, what happens to its ability to hold dissolved oxygen?**

As water gets warmer, the amount of dissolved oxygen it can hold:

a) increases

b) stays the same

*c) decreases

Title: WC_Bank- dissolved oxygen/altitude

3) **All other factors being equal, what happens to the capacity of water to hold dissolved oxygen at different altitudes?**

The amount of dissolved oxygen held by water at high altitude compared to low altitude is:

a) higher

b) the same

*c) lower

Title: WC_Bank- water density

4) At what temperature is water at its most dense?

a) 10 ^{o}C

*b) 4 ^{o}C

c) 1 ^{o}C

d) O ^{o}C

e) -4 ^{o}C

Title: WC_Bank- water freezing

5) **What is the relationship between the temperature at which water freezes and the salinity of that water?**

As the salinity of water increases, the temperature at which that water freezes:

a) increases

*b) decreases

c) stays the same

Title: WC_Bank- dissolved oxygen/ground water

6) **Compared to surface water, the dissolved oxygen in ground water pumped from a borehole is likely to be:**

a) higher

*b) lower

c) the same

Title: WC_Bank_- ground water/nitrogen

7) **Which ONE of the following substances is commonly found at a higher concentration in ground water than in surface waters.**

a) Ammonia

b) Suspended solids

*c) Dissolved nitrogen

d) Dissolved organic substances

Title: WC Bank - dissolved oxygen/biological influences

8) What biological causes can lead a water's dissolved oxygen level to INCREASE?

Select AS MANY as you believe to be correct.

a) Adding dissolved organic matter

b) Increasing plant biomass in the water

c) Respiration by aquatic organisms

***c)** Photosynthesis by aquatic plants

d) Plankton bloom collapse (die off)

Title: WC_Bank - dissolved oxygen/physical influences

9) What physical causes can lead to the amount of dissolved oxygen in water to INCREASE?

Select AS MANY as you believe to be correct.

*a) Lowering the water temperature

*b) increased wind and wave action

c) Increasing altitude

d) Increased suspended solids (turbidity)

***e)** Increased light levels

Water Characteristics Part 2

Title: WC_Bank - Biological Oxygen Demand (BOD)/definition

10) What is the Biological Oxygen Demand (BOD) of water?

Select the correct definition below

a) The amount of dissolved oxygen required by the fish living in the water

*b) The amount of dissolved oxygen needed for decomposers to break down the organic wastes present in water

c) The amount of dissolved oxygen required by all living aquatic organisms for respiration

d) The amount of dissolved oxygen produced by aquatic plants during photosynthesis

e) The amount of dissolved oxygen consumed at night-time through the respiration of all aquatic plants and animals

Title: WC Bank - Biological Oxygen demand (BOD)/increases

11) Which of the following materials and substances when introduced to the water can increase the Biological Oxygen Demand (BOD)?

Select AS MANY as you believe to be correct.

*a) Unconsumed fish feed

b) Particulate silt (mineral based)

*c) Slurry

d) Nitrates

*e) Silage effluent

Title: WC Bank - BOD/biological indicators clean

12) Which of the following freshwater river invertebrates are indicative of clean unpolluted fresh water with a low Biological Oxygen Demand (BOD)?

Select the two that indicate the highest levels of water purity and lowest BOD

a) Shrimp (Gammarus sp)

c) Water louse (Assellus sp)

*d) Mayfly nymph (Ephemeroptera sp)

e) Blood worm (Chironimid sp)

g) flatworm (Platyhelminthes sp)

*h) Stonefly nymph (Plecoptera sp)

h) Caddis larvae (Trichoptera sp)

Title: WC Bank - BOD biological indicators/dirty

13) Which of the following freshwater river invertebrates are indicative of organically polluted freshwater with a high Biological Oxygen Demand (BOD)?

Select the two that indicate water with the highest BOD

a) Shrimp (Gammarus sp)

c) Water louse (Assellus sp)

d) Mayfly nymph (Ephemeroptera sp)

*e) Blood worm (Chironimid sp)

*g) flatworm (Platyhelminthes sp)

h) Stonefly nymph (Plecoptera sp)

h) Caddis larvae (Trichoptera sp)

Title: WC Bank - Nitrogen cycle/nitrogen fixing

14) Which of the following can fix atmospheric nitrogen with the assistance of bacteria to produce Nitrate or Ammonium (NH4+)

Select AS MANY as you believe to be correct.

a) Green algae

*b) Legumes

c) Kelp

*d) Blue Green Algae

e) Zooplankton

Title: WC_Bank - Nitrogen cycle/toxicity

15) Which of the following nitrogenous compounds are toxic

Select AS MANY as you believe to be correct.

*a) Ammonia (NH3)

b) Proteins

c) Nitrate (NO3)

*d) Nitrite (NO2)

Title: WC_Bank - Nitrogen cycle/ammonia

16) Which of the following nitrogenous compound is the most toxic

Select the answer you believe to be correct.

*a) Ammonia (NH3)

b) Proteins

c) Nitrate (NO3)

d) Nitrite (NO2)

Title: WC_Bank - Nitrogen cycle/least toxic

17) Which of the following nitrogenous compounds is the least toxic

Select the answer you believe to be correct.

a) Ammonia (NH3)

b) Urea

*c) Nitrate (NO3)

d) Nitrite (NO2)

Title: WC_Bank- Nitrogen cycle/ammonia oxidisation

18) What compound or compounds is ammonia converted to in aerobic conditions

Select AS MANY as you believe to be correct.

a) Protein

*b) Nitrite (NO2)

c) Urea

*d) Nitrate (NO3)

e) Nitric acid

Title: WC_Bank - Nitrogen cycle/fish excreta

19) Which of the following nitrogenous substances are excreted by fish

Select AS MANY as you believe to be correct.

a) Nitrate (NO3)

b) Nitrite (NO2)

*c) Urine

*d) Ammonia

e) Nitric acid

Title: WC Bank - Salinity definition

20) What is salinity?

Select the most accurate definition

a) The concentration of Sodium Chloride in the water

b) A measurement of the density of the water

*c) The concentration of all salts dissolved in the water

d) The concentration of pollutants in the water

e) The acidity of the water

Title: WC Bank - Salinity/full strength

21) Which one of the following concentrations is the closest to the salinity of full-strength sea water in the North Atlantic Ocean

Select the concentration in parts per thousand (ppt)

a) 0.5 ppt

b) 15 ppt

c) 25 ppt

*d) 35 ppt

e) 45 ppt

f) 60 ppt

Title: WC Bank - Salinity/density

22) At which of the following salinities is water at its highest density?

Select the highest density water based on its salinity

a) 0.5 ppt

b) 15 ppt

c) 25 ppt

d) 35 ppt

e) 45 ppt

*f) 60 ppt

Title: WC Bank - Salinity/measurement methods

23) Which of the following methods can be used to measure salinity

Select AS MANY as you believe to be correct.

*a) Measuring water density

b) Tasting for saltines

*c) Laboratory titration

d) Filtration

*e) Measuring electrical conductivity

*f) Using a hand-held refractometer

Title: WC Bank- Salinity/measurement accuracy

24) What is the most accurate method of measuring salinity

Select the most accurate method

a) Measuring water density

b) Tasting for saltines

c) Laboratory titration

*d) Measuring electrical conductivity

d) Using a hand-held refractometer

Title: WC Bank - pH definition

25) What is water pH a measurement of?

Select AS MANY as you believe to be correct.

*a) The acidity of the water

b) The cleanliness of the water

*b) The alkalinity of the water

*c) The concentration of Hydrogen ions in the water

d) The saltiness of the water

Title: WC Bank - pH relative values

26) Which of the following values is pH neutral, (nether acidic or alkaline?)

Select the neutral pH value

a) 0

b) 3

*b) 7

c) 10

d) 14

Title: WC Bank - pH/alkalinity

27) Which of the following pH values is the most alkaline?

Select the most alkaline value

a) 1

b) 3

b) 7

c) 10

*d) 14

Title: WC Bank - pH/acidity

28) Which of the following values is the most acidic?

Select the most acidic value

*a) 1

b) 3

b) 7

c) 10

d) 14

Title: WC Bank pH/logarithmic scale

29) What is the difference between a pH of 6 and 5

Select the correct answer

a) A pH of 5 is twice as acidic as a pH of 6

b) A pH of 5 is one hundred times as alkaline as a pH of

b) A pH of 5 is ten times as alkaline as a pH of 6

c) A pH of 5 is one hundred times as acidic as a pH of 6

*d) A pH of 5 is ten times as acidic as a pH of 6

Title: WC Bank – pH/water acidification

30) Which of the following factors can contribute towards the acidification of freshwaters

Select AS MANY as you believe to be correct.

a) Leaf litter from mixed deciduous woodlands

b) Underlying geology of hard rocks of a volcanic origin

*c) Water run-off from peat bogs in the water catchment

d) Underlying geology of carboniferous limestone rocks

*e) Gaseous emissions from power stations burning fossil fuels

f) Photosynthesis by aquatic plant life

*g) Leaf litter from coniferous tree plantations

*h) The carbon dioxide released by respiration of aquatic flora and fauna

Title: WC Bank – pH/buffering acidification

31) Which of the following factors can counteract and reduce the acidification of freshwaters

Select AS MANY as you believe to be correct.

a) Leaf litter from mixed deciduous woodlands

b) Underlying geology of hard rocks of a volcanic origin

c) Water run-off from peat bogs

*d) Underlying geology of carboniferous limestone rocks

e) Gaseous emissions from power stations burning fossil fuels

*f) Photosynthesis by aquatic plant life

g) Leaf litter from coniferous tree plantations

h) The carbon dioxide released by respiration of aquatic flora and fauna

Title: WC Bank - Water hardness/ is a measurement of

32) What is water hardness a measurement of?

Select the answer you believe to be the most accurate and complete.

a) The total concentration of chemical bases

b) The concentration of calcium carbonate

c) The concentration of calcium and magnesium salts

d) The alkalinity of the water

*e) The concentration of magnesium and calcium salts of carbonate, sulphate and chloride

f) The acidity of the water

Title: WC Bank - Alkalinity definition

33) How is alkalinity commonly defined?

Select all definitions below that you believe to be true.

a) The pH of the water

*b) Water's capacity of to resist changes in pH that would acidify it

c) The hardness of water

*d) The concentration of carbonate, bicarbonate and hydroxide ions

e) The concentration of sulphate and chloride ions

Title: WC Bank – Alkalinity/rock type

34) Which of the following rock types if found in a water catchment can increase water alkalinity?

Select AS MANY as you believe to be correct.

*a) Limestone

b) Granite

*c) Chalk

e) Basalt

*f) Sandstone (marine origin)

g) Sandstone (desert origin)

Title: WC Bank - Water hardness/total & temporary

35) What are the differences between permanent hardness and temporary hardness?

Select AS MANY statements as you believe to be true.

*a) Temporary hardness can be removed by boiling water or by adding lime.

b) Temporary hardness can be removed by adding an acidic substance

*c) Temporary hardness is due to the presence of bicarbonate minerals that can dissolve in water, mainly magnesium and calcium carbonates

*d) Permanent hardness is due to sulphates and chlorides of magnesium and calcium

e) Permanent hardness can be removed by boiling the water

Title: WC Bank - Total Dissolved Solids (TDS)

36) What is the differences between Total Dissolved Solids (TDS) and hardness?

Select AS MANY statements as you believe to be true.

a) TDS is a measure of dissolved organic substances

*b) TDS is a measure of the combined content of all inorganic and organic substances, whether in molecular, ionized or micro-granular (colloidal) suspended form

*c) Hardness is a measure of the concentration of calcium and magnesium carbonates and bicarbonates

*d) TDS include inorganic and organic substances that cannot be filtered out by a filter paper

*e) Hardness is a measure of the concentration of calcium and magnesium salts and is unaffected by the concentration of dissolved organic substances

Title: Turbidity and Suspended Solids

Title: WC Bank – Total Dissolved Solids/Suspended Solids

37) What is the differences between the Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) of a water sample?

Select AS MANY statements as you believe to be true.

a) Substances that are sufficiently small enough to pass through a filter paper are classified as suspended solids

*b) After water has been filtered to remove the TSS, the filtrate will contain the (TDS) which can be measured subsequently

*c) The total solids of a water sample are a combination of the TSS and TDS

e) TDS includes organic substances that can be filtered out by a filter paper

*f) The solid particulate matter collected when water is filtered can be weighed to establish the concentration of TSS