وزاره التربية والتعليم والتعليم الفني
الادارة المركزية للتعليم العام
مكتب مستشار العلوم



الغلاف الحيوي



الغلاف الجوي

INTEGRATED SCIENCE

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الفصل الدراسي الأول



الغلاف الصخري



الغلاف المائي

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والمشرف على مسلشاري المواد الدراسية

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Homework

First: Choose the correct answer

Q1:

Which of the following chooses lists the abiotic factors that made up the ecosystem?

A) Humans, plants, and animals.

B) Light, air, water, and soil.
C) Microorganisms, soil, and water.
D) Biosphere and hydrosphere.

Q2:

The percentage of freshwater available for human consumption in rivers, lakes, and groundwater is approximately:

A) 70% of the total water on Earth.
B) 97% of the total water on Earth.
C) 2% of the total water on Earth.
D) 1% of the total water on Earth.

Q3:

What is the biological process carried out by plants that mainly contributes to the release of water vapor into the atmosphere through the microscopic openings in their leaves?

A) Infiltration.
B) Transpiration.
C) Condensation.
D) Precipitation.

Q4:

If you have a sample of pure water molecules with a total molecular mass of 900 grams, what is the approximate mass of hydrogen in this sample based on the percentages of the components of the water molecule?

A) 100 grams.
B) 800 grams.
C) 11.11 grams.
D) 88.89 grams.

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Q5:
When a crystal of table salt (NaCl) dissolves in water, which of the following statements correctly describes the behavior of the chloride ion (Cl^-) resulting from dissociation?
A) It is attracted toward the Hydrogen atoms carrying partial positive charges (δ^+).
B) It is attracted toward the Oxygen atoms carrying partial negative charges (δ^-).
C) It chemically reacts with water ions to form Hydrochloric acid.
D) It forms a new covalent bond with an oxygen atom.

Q6:
What is the maximum number of hydrogen bonds that one molecule of liquid water can be surrounded by with its neighboring water molecules?
A) One bond.
B) Two bonds.
C) Three bonds.
D) Four bonds.

Q7:
Considering the structural formulas of water (H_2O) and hydrogen sulfide (H_2S), which of the following analyses explains the higher boiling point of water (100°C) compared with H_2S, which boils at (-61°C), even though the molar mass of H_2S is greater?
A) The weakness electronegativity of oxygen gives it greater thermal stability.
B) Water molecules can form a network of strong Hydrogen bonds as a result of their high polarity.
C) The bond angle in a Hydrogen sulfide molecule is much greater than 104.5°.
D) Water molecules completely change into pure covalent bonds upon heating.

Q8:
"The process of dissolving sodium chloride (NaCl) in water is not considered a hydrolysis process." Which of the following statements accurately analyzes and supports this scientific fact?
A) Because the salt does not dissociate into free ions but remains in its crystalline form.
B) Because the ions resulting from the dissociation of the salt do not react with water to form acids or bases.
C) Because the water molecules surrounding the ions prevent the ionization of water into Hydrogen and Hydroxide ions.
D) Because the dissolution process directly changes the chemical neutrality of pure water.

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Second: Essay Questions

Q9:

The natural environment consists of four main interconnected spheres that continuously affect and are affected by human activities. Mention these four spheres as you have studied.

Q10:

Through your study of the process of excretion in living organisms as a part of the water cycle, identify three types of wastes produced by metabolic activities that the living organism eliminates.

Q11:

Define the concept of "electronegativity", and briefly explain how it leads to the appearance of partial charges on the atoms of a water molecule.

Q12:

Transpiration in plants has an important vital role that depends on the mechanical properties of water. Explain how transpiration contributes to the transport of substances within the plant, and what is its associated thermal effect?

Q13:

When ionic compounds are added to water, their crystal net dissociates into free ions. Apply the concept of polarity to explain how water molecules are arranged around the positively charged sodium ions (Na^+).

Q14:

Write the balanced chemical equation representing the limited self-ionization of pure water, then explain, based on the products of this equation, why pure water is chemically neutral.

Q15:

The hydrogen bond is defined as an "electrostatic attraction." Analyze the molecular structure of water to identify the structural and electrical conditions that must be present in adjacent molecules for this bond to form.

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Q16:

The plasma membrane of a living organism's cell has the property of allowing substances to pass into and out of the cell. Infer the role that water plays as a "universal solvent" in enabling this vital cellular process.

****** End of Questions ******

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Weekly assessment

Model (A)

First: Choose the correct answer

Q1: What percentage of water suitable for direct use is available as freshwater in rivers, lakes and streams out of the total water on Earth?

A) 70%

B) 97%

C) 1%

D) 2%

Q2: Which of the following physical changes represents the transformation of water molecules as they leave the stomata of plant leaves and enter the surrounding atmosphere?

A) From liquid to solid

B) From liquid to gas

C) From gas to liquid

D) From solid to gas

Q3: If the electronegativity of the oxygen atom in a water molecule increased beyond its natural value, what would be the logical expected result?

A) The partial negative charge on the oxygen atom decreases.

B) The polarity of the molecule increases and the hydrogen bonds become stronger.

C) The boiling point of water decreases to become lower than the boiling point of hydrogen sulfide.

D) Water changes into a non-polar compound that is unable to dissolve substances.

Second: Essay Questions

Q4: "The natural environment consists of four main spheres that are interconnected through complex interactions that affect and are affected by human activities." Discuss this statement in detail, mentioning the names of the four spheres, and trace the pathway of a liquid chemical pollutant discharged into a river, explaining how it can move and affect the other spheres.

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Q5: The environment includes biotic factors and abiotic factors. Mention examples of each based on what you have studied.

Q6: Give a scientific explanation: Although the molecular mass of Water molecule H_2O is lower than the molecular mass of hydrogen sulfide H_2S, the boiling point of water is very high (100°C) compared with that of hydrogen sulfide (-61°C).

Model (B)

First: Choose the correct answer

Q1: What is the natural and fundamental barrier that prevents the majority of freshwater on Earth, which represents 2% of the total water supply, from being used?

A) It is found entirely in deep rocky underground layers.

B) It is trapped in the solid physical state (frozen ice caps).

C) It is continuously exposed to evaporation due to Sun.

D) It is directly mixed with the saltwater of seas and Oceans.

Q2: If severe drought occurs in an area, resulting in a sharp decrease in the rates of water evaporation from the surface and transpiration from vegetation, how would this directly affect a later stage of the water cycle?

A) The amount of surface runoff from rainfall increases.

B) The rates of condensation and cloud formation decrease.

C) The percentage of flowing freshwater automatically increases.

D) The movement of groundwater stops completely.

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Q3: When table salt crystals (NaCl) are added to water, water molecules arrange themselves around the dissociated ions. How do water molecules surround the negative chloride ion (Cl^-) according to the property of polarity?

A) They surround it with oxygen atoms having partial positive charges.

B) They surround it with hydrogen atoms having partial positive charges.

C) They surround it with oxygen atoms having partial negative charges.

D) The salt ions separate without any interaction or arrangement of water molecules around them.

Second: Essay Questions

Q4: "The ecosystem is an integrated system whose living organisms and non-living components cannot be separated." Explain the statement, identifying the four spheres that make it up. Then predict the environmental effects that may extend across these spheres if humans extensively burn and clear tropical forests.

Q5: Precisely determine the bond angle formed between the two single covalent bonds in a Water molecule, and mention the two names given to the ions produced during the limited self-ionization of pure water.

Q6: Explain the following statement: based on the cellular structure of living organisms "How does the plasma membrane surrounding living cells contribute to demonstrating the great biological importance of water as a solvent?"

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Model (C)

First: Choose the correct answer

Q1: If you know that saltwater constitutes about 97% of the total volume of the hydrosphere on Earth, what is the approximate percentage represented by freshwater in all its forms (available and frozen)?

A) 70%

B) 30%

C) 3%

D) 1%

Q2: A city depends on pumping groundwater to irrigate crops at a rate much faster than the rate of rainfall and groundwater recharge. Based on your study, which stage of the water cycle is being directly depleted and its balance disrupted?

A) Evaporation and transpiration from leaf surfaces

B) Condensation in clouds

C) Infiltration through the pores of sedimentary rocks to form groundwater

D) Direct precipitation of snow

Q3: What is the best structural explanation for the polarity of the water molecule based on the covalent bond between Oxygen and Hydrogen?

A) The ability to attract electrons is equal between the Hydrogen and Oxygen atoms.

B) Electrical charges are emitted from the Hydrogen atom because of its high electronegativity.

C) The Oxygen atom attracts the bonding electrons toward itself for a longer period because of its higher electronegativity.

D) The water molecule completely dissociates into separate ions as soon as the covalent bond is formed.

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Second: Essay Questions

Q4: Explain the concept of an ecosystem, and use it to trace how human activity represented by air pollution with industrial acidic gases can cause an extended imbalance that harms the other environmental spheres.

Q5: Explain how the high electronegativity of the Oxygen atom compared with the Hydrogen atom leads to the formation of Hydrogen bonds between adjacent Water molecules.

Q6: Give a scientific explanation: "Why is the plant's ability to carry out transpiration through Water molecules considered an essential basis for protecting the plant and supporting its biological growth in high-temperature environments?"

***** End of Questions *****

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