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VCE Chemistry ½

Solubility & Precipitation [1.9]

Test

20 Marks. 1 Minute Reading. 16 Minutes Writing.

Results:

Quiz Questions	_____ / 15
Extension	_____ / 5

Section A: Quiz Questions (15 Marks)

Question 1 (4 marks)

Tick whether the following statements are **True** or **False**.

	True	False
a. Sodium is fully positive whereas the hydrogen of a water molecule is only partially positive on that end.		
b. An ion-dipole bond occurs when an ion forms covalent bonds with the dipole of another molecule.		
c. Covalent bonding is an example of an intramolecular bond whereas dispersion forces are an example of an intermolecular bond.		
d. Hydrogen bonds are the strongest type of intermolecular force.		
e. If a solution is aqueous, it means that there has been some solute dissolved into water.		
f. Sodium ethanoate is a non-soluble substance, and due to this, it will form a precipitate if added to a container of water.		
g. AgCl is an example of an insoluble compound, due to having stronger forces of attraction between the individual Ag and Cl ions, than between the ions and water molecules.		
h. Water and oil are miscible with each other, as oil floats at the top.		

Space for Personal Notes

Question 2 (7 marks)

Lead iodide is an insoluble chemical compound that can be produced from the combination of lead nitrate and potassium iodide, as shown in the equation below.

$$Pb(NO_3)_2\,(aq) + 2KI\,(aq) \rightarrow PbI_2\,(s) + 2KNO_3\,(?)$$

a. What is the meaning of the (aq) symbol as compared to the (s) symbol? (1 mark)

b. Explain how potassium iodide is soluble in water, with reference to the relevant intramolecular and intermolecular bonds. (2 marks)

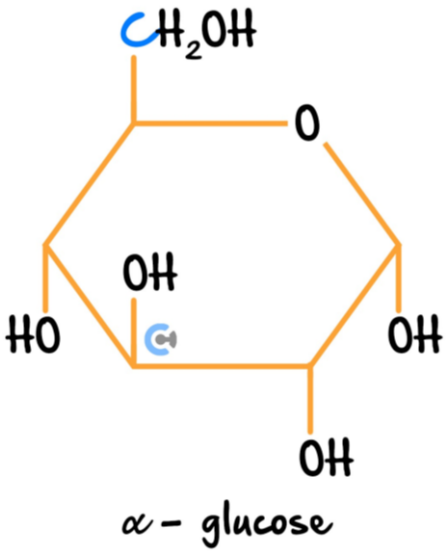
c. Given that a chemist wanted to use the lead iodide produced from this reaction, how could it be separated from the solution? (1 mark)

d. Is KNO_3 soluble or insoluble in water? (1 mark)

e. Explain with reference to the intramolecular bonds, why PbI_2 is insoluble in water. (2 marks)

Question 3 (4 marks)

Below is a molecule of glucose. In the lab, Harry takes a spoonful of glucose and places it into a beaker full of vegetable oil. However, he notices that after stirring it, the glucose does not dissolve. Harry makes sure to note this observation into his practical book to investigate further at a later time.



α – glucose

a. With reference to the structure of glucose and its polarity, explain the observation which Harry noted. (2 marks)

_____

_____

_____

_____

b. What intermolecular forces would form between this glucose molecule and water? Thus, would glucose be soluble in water? (1 mark)

_____

_____

c. Describe the intramolecular forces which are present within the glucose molecule. (1 mark)

_____

_____

Section B: Extension (5 Marks)

Question 4 (5 marks)

Calcium carbonate is a dietary supplement taken by individuals when the amount of calcium in the diet is not enough. In a dry form, it can be found as a white powder. $Ca^{2+}(aq)$ ions produce a yellow-grey colour in solutions.

a. Write the complete balanced chemical equation to show the formation of calcium carbonate through the reaction between calcium chloride and sodium carbonate. (1 mark)

_____

b. What observation would a chemist be able to make to know that the calcium has been converted from its reactant form to its final product form? Explain with reference to solubility and dissolution of ionic compounds. (3 marks)

_____

_____

_____

_____

c. Provide the ionic equation for this reaction. (1 mark)

_____

_____

Space for Personal Notes

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