Name: _____

Preliminary Chemistry

Lesson 6 & 7
Water

In Homework. This booklet your best friend.

34 Synergy Education

Success is Contagious. Synergy Chemistry.

0466 342 939 garyzhanghsc@gmaiil.com www.hscsynergyeducation.weebly.com

Summary of Key Words

Account
Account for: state reasons for, report on. Give an account of: narrate a series of events or transactions

Analyse
Identify components and the relationship between them; draw out and relate implications

Apply
Use, utilise, employ in a particular situation

Assess
Make a judgement of value, quality, outcomes, results or size

Calculate
Ascertain/determine from given facts, figures or information

Clarify
Make clear or plain

Classify
Arrange or include in classes/categories

Compare
Show how things are similar or different

Construct
Make; build; put together items or arguments

Contrast
Show how things are different or opposite

Deduce
Draw conclusions

Define
State meaning and identify essential qualities

Demonstrate
Show by example

Describe
Provide characteristics and features

Discuss
Identify issues and provide points for and/or against

Distinguish
Recognise or note/indicate as being distinct or different from; to note differences between

Evaluate
Make a judgement based on criteria; determine the value of

Examine
Inquire into

Explain
Relate cause and effect; make the relationships between things evident; provide why and/or how

Extract
Choose relevant and/or appropriate details

Extrapolate
Infer from what is known

Identify
Recognise and name

Interpret
Draw meaning from

Investigate
Plan, inquire into and draw conclusions about

Justify
Support an argument or conclusion

Outline
Sketch in general terms; indicate the main features of

Predict
Suggest what may happen based on available information

Propose
Put forward (for example a point of view, idea, argument, suggestion) for consideration or action

Recall
Present remembered ideas, facts or experiences

Recommend
Provide reasons in favour

PART A: MULTIPLE CHOICE

Question 1 (Cranbrook 2007 – Qu 11)

What is the concentration of a solution if 11.54g of pure barium hydroxide is dissolved in exactly 250mL water in a volumetric flask?

a) $6.74 \times 10^{-2}\ mol/L$
b) $1.68 \times 10^{-2}\ mol/L$
c) $2.69 \times 10^{-2}\ mol/L$
d) $2.89\ mol/L$

Question 2

The density of water at 25°C is 1.00 gcm^{-3}. The density of ice at 0°C is 0.917 gcm^{-3}. What volume change would occur if an ice cube of mass 9.50g, initially at 0°C, melted to form liquid water with a final temperature of 25°C?

a) An increase in volume of 0.86L would occur
b) An decrease in volume of 0.86L would occur
c) An increase in volume of 0.79L would occur
d) An decrease in volume of 0.79L would occur

Question 3

A solution is made by dissolving 0.1 mol of sodium chloride, and 0.1 mol of calcium chloride in water to make a volume of 200mL of solution.

What are the ionic concentrations in mol/L of this solution?

	$[Na^+]$	$[Ca^{2+}]$	$[Cl^-]$
a)	0.1	0.1	0.2
b)	0.5	0.5	1.0
c)	0.5	0.5	1.5
d)	0.2	0.2	0.6

Question 4 (Independent 2004 – Qu 11)

The reaction between barium chloride and potassium sulfate solutions produces a precipitate of barium sulfate:

$$BaCl_2 + K_2SO_4 \rightarrow BaSO_{4(s)} + 2KCl$$

If 50mL of 0.50 mol/L $BaCl_2$ was reacted with excess K_2SO_4 solution. How many moles of $BaSO_{4(s)}$ would be precipitated?

a) 0.025 mol
b) 2.33 mol
c) 25 mol
d) 233 mol

Question 5 (Independent 2005 – Qu 15)

What types of bonds are present in alkenes?

a) Single covalent bonds only
b) Double covalent bonds only
c) Single and double covalent bonds
d) Covalent and hydrogen bonds

Question 6 (HSC)

When 13.08g of pure zinc reacts with excess dilute hydrochloric acid, the volume of dry hydrogen gas given off at 298K and 101.3 kPa pressure is -

a) 2.45L
b) 4.89L
c) 9.79L
d) 12.23L

Question 7 (HSC)

0.01 mole of a chloride of an element Z requires exactly 20mL of 1.00 mol/L silver nitrate solution for complete reaction. The formula of the chloride of Z is -

a) ZCl_4
b) ZCl_4
c) ZCl_4
d) ZCl

PART B: SHORT RESPONSE

Question 1 (Exam Choice 2011 – Qu 27)

A typical 500mL bottle of mineral water contains the following information about the concentration of ions in the water.

Substance	Concentration (mg/L)
Calcium	25.0
Magnesium	4.5
Potassium	1.0
Sodium	6.5
Hydrogencarbonate	103
Sulfate	10.5
Nitrate	7.0
Chloride	5.5

a) Calculate the total mass of ions with a change of 2+ in this bottle of water. (2 marks)

b) 200mL of this water is added to 50mL of freshly squeezed lemon juice. Assuming the lemon juice contains no sulfate ions, calculate the concentration of sulfate ions in this mixture. (in mol/L) (3 marks)

Question 2

You may need to use the information in the table below to answer this question.

Anion or cation present in salt	General Solubility Rule	Main exceptions
Group I metal	All salts soluble	No exceptions
Ammonium	All salts soluble	No exceptions
Nitrate	All salts soluble	No exceptions
Chloride	Most salts soluble	Lead(II); mercury(II), silver
Sulfate	Most salts soluble	Lead(II); mercury(II), silver, barium
Carbonate	Most salts insoluble	Group I and ammonium cations
Hydroxide	Most salts insoluble	Group I and ammonium cations, barium

Two methods for preparing a salt are:

Method 1: Add an excess of insoluble base, or an excess of metal to an acid, and when the reaction is complete, remove the excess by filtration.

Method 2: Mix two solutions and obtain the salt by precipitation.

A student wants to prepare copper (II) hydroxide. Identify which method is appropriate, the reagents (reactant) required, and write an equation for the reaction.

(3 marks)

Question 3 (Exam Choice 2008 – Qu 26)

A student transferred 1.35g of $Cu(NO_3)_{2(s)}$ and 1.35g of $Na_2CO_{3(s)}$ to separate beakers, and dissolved each in 100mL of water. The student then mixed the two solutions, producing a blue precipitate.

a) Write a chemical equation for this reaction. (1 mark)

b) Calculate the mass of $CuCO_3$ that could be formed in this reaction. (3 marks)

Question 4 (Independent 2004 – Qu 22)

a) Calculate the mass of barium chloride crystals ($BaCl_2.2H_2O$) required to prepare 200mL of solution with a concentration of 0.50 mol/L. (3 marks)

b) This solution is diluted to a volume of 500mL. Determine the chloride ion concentration in the diluted solution. (2 marks)

Question 5 (HSC)

2.08g of anhydrous barium chloride was dissolved in water to make 50mL of solution and then added to 50mL of an aqueous solution containing 2.84g of anhydrous sodium sulfate. A white precipitate formed.

a) Write an ionic equation for the reaction forming the precipitate. (1 mark)

b) What is the mass (in grams) of the precipitate formed? (You may leave the answer as a fraction.) (2 marks)

c) Calculate the concentration of sulfate ions in the final solution. (3 marks)

Question 6

a) What volume of 4.50M HCl can be made by mixing 5.65M HCl with 250.0mL of 3.55M HCl?

b) To what volume should you dilute 133 mL of an 7.90 M $CuCl_2$ solution so that 51.5 mL of the diluted solution contains 4.49 g $CuCl_2$?

c) 1.00 L of a solution is prepared by dissolving 125.6 g of NaF in it. If I took 180 mL of that solution and diluted it to 500 mL, determine the molarity of the resulting solution.

d) Container A holds a solution that is 80% alcohol while container B holds a solution that is 20% alcohol. How many liters of the solution in container A are needed to produce 12 liters of a solution that is 60% alcohol?