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90934



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SUPERVISOR'S USE ONLY

Level 1 Chemistry, 2017

90934 Demonstrate understanding of aspects of chemical reactions

9.30 a.m. Tuesday 14 November 2017

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of chemical reactions.	Demonstrate in-depth understanding of aspects of chemical reactions.	Demonstrate comprehensive understanding of aspects of chemical reactions.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

A periodic table and other reference material are provided in the Resource Booklet L1–CHEMR.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Excellence

TOTAL

22

ASSESSOR'S USE ONLY

QUESTION ONE

- (a) (i) Complete the table below to show the type of chemical reaction occurring.

Reaction	Chemical Reaction	Type of chemical reaction occurring
1	A piece of magnesium metal is held in a blue Bunsen burner flame.	combination reaction
2	Some hydrogen peroxide solution is placed in a test tube with a small amount of manganese dioxide powder.	decomposition reaction
3	A small amount of lithium carbonate powder is heated in a boiling tube.	decomposition reaction
4	A small volume of zinc sulfate solution is placed into a test tube and a clean piece of aluminium metal added.	displacement reaction.

- (ii) What would be observed during **Reaction 1** and **Reaction 2**?

Link the observations to species involved.

Reaction 1:

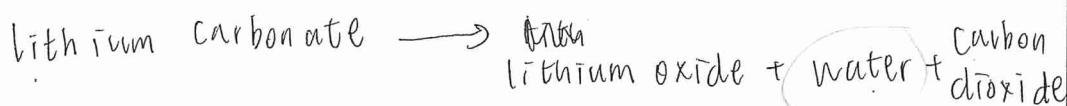
When a piece of magnesium is held in a blue flame, a bright white glow will occur and the silver solid will become white solid powder.

Reaction 2:

The test tube will bubble and fizz and then when the black solid manganese dioxide is added to the colourless solution of hydrogen peroxide, the black solid disappear and the test tube is getting warm.

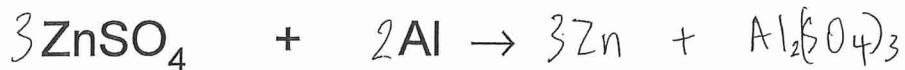
- (iii) Write a word equation for **Reaction 3** in the box below.

Word equation for **Reaction 3**:



- (iv) Complete the symbol equation for Reaction 4 in the box below.

Balanced symbol equation for Reaction 4:



- (b) New compounds can be formed during chemical reactions.

Compare and contrast the methods that could be used to prepare samples of iron sulfide, sulfur dioxide and copper oxide.

In your answer, for the preparation of each compound, you should:

- identify the type of reaction occurring
- describe any observations that would be seen, and link these to the reactants and products
- write balanced symbol equations.

Balanced symbol equations:



For iron sulfide, we can use combination reaction between iron grey solid and sulfur yellow solid, when two solid is mixed and heated together, it will form a new

product iron sulfide which is a dark grey solid

Iron magnetic powder, ~~then you will observe colour change~~, For sulfur dioxide, we can use combination reaction between sulfur and

oxygen and colour less gas which will become a (smell) bad smell when sulfur dioxide is produced which is a colourless gas.

These two chemical reaction like combination reaction that is two or

There is more space for your answer to this question on the following page.

more reactant substance chemically combined together to form one product. For copper oxide, we can use a (thermal) decomposition which is one reactant break down to two or more product / substance. Put a small amount of ~~green~~ green copper carbonate ^{solution} in the test tube and heated it, and you will observe the green ~~water~~ ^{solution} of ~~becomes~~ copper carbonate ~~black solid~~ ^{becomes} ~~black solid~~ of copper oxide, and you will also observe bubbling and fizzing colourless gas which is carbon dioxide that can test with lime water if ~~the~~ the lime water turns milky. When the water is evaporate turn gaseous, some black solid powder will form and that is copper oxide.

E8

QUESTION TWO

- (a) Zinc metal reacts with lead nitrate in a displacement reaction. Zinc chloride solution also reacts with lead nitrate; however, this is not a displacement reaction.

- (i) Complete the word equations below for these two reactions.



- (ii) Explain why the reaction between zinc chloride and lead nitrate is **not** classified as a displacement reaction, but the reaction between zinc metal and lead nitrate is.

In your answer, you should identify what type of reaction is occurring between zinc chloride and lead nitrate.

Zinc and lead nitrate is classified as a displacement reaction because zinc is more reactive than lead so zinc will lose electrons easily compare the lead.

Zinc will lose 2 electrons and lead will gain 2 electrons

that zinc metal / atom will become zinc ions, and lead ions will become lead metal / atom. This include a electron transfer in the displacement reaction.

The reaction between zinc chloride and lead nitrate is a ~~precipitation~~ precipitation reaction that two solution mix together form ~~some~~ some solid. When zinc chloride is added into lead nitrate, two colourless solution will form some white precipitate which is lead chloride and it is insoluble, and another colourless solution of zinc nitrate will form as well.

Two ions are sharing electrons to have no overall charge

This reaction does not involve electron transfer

It is not classified as a displacement reaction !!.

- (b) Metals can be put into a reactivity series based on the reactions between metals and solutions. The table below shows the results of putting metals A, B, and C into metal sulfate solutions.

Solution	Metal A	Metal B	Metal C
Metal A sulfate		No reaction	No reaction
Metal B sulfate	Displaces B		Displaces B
Metal C sulfate	Displaces C	No reaction	

Analyse the results to determine the order of reactivity for the three metals A, B, and C.

Justify your answer by linking the results to your knowledge of displacement reactions.

You do NOT need to identify each metal.

From the information on the table, we can tell that Metal A is the most reactive metal in those three because metal A ~~sulfate~~ can displace all metal B and C.

The metal can only displace the metal with low activity series. As metal A can displace metal B and C, that mean the activity series of metal A is higher than B and C metal. Also you can tell metal A is the most reactive because metal A sulfate ~~sulfate~~ didn't react with metal B and metal C. High activity series metal with solution cannot react with the metal with low activity. From the metal B, it shows that have no reaction is metal A and B ~~sulfate~~ sulfate, it shows that metal B is not more reactive than A and C atom. In metal C, ~~no~~ has no reaction with metal A sulfate but displace B when ~~reactive~~ react with metal B sulfate. That means the activity series is between metal A and metal B as metal C can displace ~~in meta~~ Metal B sulfate which means activity series B higher than B and no reaction with metal A. Solution shows that the activity is lower than metal A. So the order from high activity to low activity is metal A, C, B. ~~metals~~

QUESTION THREE

- (a) (i) Which of the following substances are soluble in water?

You may use the solubility rules provided in the resource booklet.

Substance	Soluble in water? Yes/No
Zinc carbonate	No
Potassium hydroxide	Yes
Barium chloride	Yes

- (ii) For each of the pairs of solutions below, identify whether a precipitate will form when the solutions are mixed.

Name any precipitates that form.

Solution being mixed	Precipitate forms? Yes/No	Name of precipitate
sodium carbonate and calcium chloride	Yes	calcium carbonate
sodium hydroxide and potassium nitrate	No	
sodium sulfate and lead nitrate	Yes	lead sulfate

- (iii) Choose ONE of the pairs of solutions from the table above that **forms a precipitate**, and elaborate on the reaction occurring.

In your answer, you should:

- describe any observations that would be seen, and link them to the reactants and products involved
- explain why the reaction is classified as a precipitation reaction by referring to the ions in both solutions and the precipitate formed.

Precipitation is when two solution mix together to ~~form~~ form a solid which that two solution is crossed-mix.

When Sodium Carbonate ~~with~~ a colourless solution mixed with calcium chloride solution colourless solution, there will be white precipitate formed called calcium carbonate and a colourless solution formed, sodium chloride.

There will be no overall charge in the precipitate when two ions bond together ..

(b) Three solutions containing negative ions/anions have been mislabelled.

One of the solutions contains sulfate ions, one of them contains chloride ions, and one contains iodide ions.

It is known that the solutions contain no other negative ions/anions.

How could the solutions be tested to determine which solutions contain each of the three ions: sulfate, chloride, and iodide?

In your answer, you should:

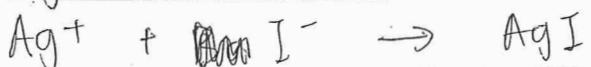
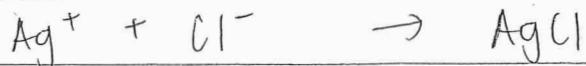
- describe a method that could be carried out in a school laboratory, using barium nitrate and silver nitrate as test solutions
- identify any precipitates formed and link these to any observations that would be made
- explain how the results could be used to identify the solutions
- give balanced ionic equations for ALL precipitates formed.

You may use the solubility rules provided in the resource booklet.

Can use precipitation reaction to determine those three ions.

By using barium nitrate solution and mixed with the unknown solution, if there is a white precipitate observed, that solution contains sulfate ions because barium nitrate sulfate is insoluble that won't dissolve in water.

By using silver nitrate solution a colourless solution mixed with the unknown solution, if there is a white precipitate is formed, that unknown solution contains chloride ions because silver chloride is insoluble which will form a precipitate. To test if there is a iodide ions in the solution, you can add silver nitrate into the solution to see if there is a yellow precipitate in, if there is, the unknown solution contains iodide ions because silver iodide is insoluble and in the colour yellow. By using the precipitation reaction, you can identify which solution contains which ions with different solutions and observation.



Subject:		Chemistry	Standard:	90934	Total score:	22
Q	Grade score	Annotation				
1	E8	(a)(i) type of decomposition missing (a)(ii) 2 correctly LINKED observations (4 needed for m) (a)(iii) has water as a product incorrectly (a)(iv) and (b) 3 correctly balanced symbol equations for an e point (b) Correctly recognised all 3 reaction types, heat required and all observations stated correctly and linked to reactants/products				
2	E7	(a)(i) both answers correct (a)(ii) correctly identifies the precipitation reaction and correctly explains the precipitation reaction with some omissions in detail and an error in understanding. The explanation for displacement is very clear, correct and detailed. (b) Displacement already explained correctly on previous page.				
3	E7	(a)(i) all answers correct (a)(ii) all answers correct (a)(iii) All observations linked to reactants and products with correct explanation of process, but no referral to ions (b) all 3 equations correct and procedure and observations for identification of unknowns clear and logical.				