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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.

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QUESTION ONE

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(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.	
2	Some hydrogen peroxide solution is placed in a test tube with a small amount of manganese dioxide powder.	
3	A small amount of lithium carbonate powder is heated in a boiling tube.	
4	A small volume of zinc sulfate solution is placed into a test tube and a clean piece of aluminium metal added.	

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

Link the observations to species involved.

Reaction 1:

Reaction 2:

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

Word equation for **Reaction 3**:

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

Balanced symbol equation for **Reaction 4**:

$$ZnSO_4 \quad + \quad Al \rightarrow$$

(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:

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

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QUESTION TWO

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(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.

zinc + lead nitrate $\rightarrow$

zinc chloride + lead nitrate $\rightarrow$

(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.

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(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.

QUESTION THREE

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(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	
Potassium hydroxide	
Barium chloride	

(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		
sodium hydroxide and potassium nitrate		
sodium sulfate and lead nitrate		

(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.

(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.

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Extra paper if required.
Write the question number(s) if applicable.

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