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Level 1 Chemistry 2020

90934 Demonstrate understanding of aspects of chemical reactions

9.30 a.m. Friday 4 December 2020
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.

TOTAL

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QUESTION ONE

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

(a) Name the precipitate formed when the following solutions are mixed together.

(i) Copper nitrate and potassium hydroxide:

(ii) Sodium carbonate and barium nitrate:

(b) (i) Lead nitrate solution and sodium chloride solution react to form a precipitate.

Write a balanced ionic equation for this reaction.

(ii) Why is this reaction classified as a precipitation reaction?

(iii) Describe any observations that would be made during this reaction, and link them to the reactants and products.

(c) Two white solids are known to be lithium carbonate and sodium hydrogen carbonate.

The two solids can be identified in the school laboratory using decomposition reactions and simple laboratory tests.

Compare and contrast the methods used and the observations that would be made during the identification procedure.

Support your answer with balanced symbol equations for the decomposition reactions.

Balanced symbol equations for both decomposition reactions:

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QUESTION TWO

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(a) Hydrogen peroxide forms in the body as a product of metabolism. The hydrogen peroxide can then form substances that can cause damage in the body. The liver produces an enzyme called catalase, which is a type of catalyst, to protect against this damage.

Explain how catalase prevents hydrogen peroxide causing harm in the body.

In your answer, you should:

- explain the type of reaction occurring
- state the products formed during this reaction
- describe a laboratory test that could be used to test for one of the products
- write a balanced symbol equation for the reaction.

Balanced symbol equation:

(b) A pale green solution is thought to be iron(II) sulfate. The identity of the solution could be determined using the reagents below:

- a piece of clean magnesium metal
- a piece of clean lead metal
- barium nitrate solution
- sodium hydroxide solution.

Elaborate on how the reagents could be used to confirm the identity of the solution.

In your answer, you should:

- give a description of a method that could be used
- link observations to any products formed if the solution is iron(II) sulfate
- write balanced symbol equations for any reactions that would occur if the solution is iron(II) sulfate
- explain how each reagent is used to confirm the identity of the solution.

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QUESTION THREE

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(a) A teacher showed students digital recordings of three different reactions.

Reaction	Description of procedure
1	A mixture of hydrogen and oxygen gases was ignited.
2	A sample of lead hydroxide was strongly heated in a boiling tube.
3	A piece of magnesium metal was added to a solution of copper nitrate.

(i) What are the types of reaction occurring?

Reaction	Type of reaction occurring
1	
2	
3	

(ii) Complete the following equations for Reaction 1 and Reaction 2.

Reaction 1 word equation:

hydrogen + oxygen →

Reaction 2 balanced symbol equation:

$Pb(OH)_2$ →

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(iii) What would be observed during Reaction 3?

Describe the reaction that would occur, and link the observations to the species involved.

Write a balanced symbol equation for Reaction 3.

Reaction 3 balanced symbol equation:

Question Three continues on the following page.

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(b) Students were shown a digital recording of another reaction. Finely ground samples of aluminium powder, Al, and iodine powder, I_2, were mixed together. When a hot glass rod was placed in this mixture, a vigorous reaction occurred, and a white solid was formed.

Elaborate on the reaction occurring.

In your answer, you should:

- classify this reaction with reasons, and explain any electron transfer occurring
- write a word and a balanced symbol equation for the reaction.

Word equation:

Balanced symbol equation:

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

QUESTION NUMBER

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