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Level 1 Chemistry 2022

90934 Demonstrate understanding of aspects of chemical reactions

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.

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

Do not write in any cross-hatched area (▨). This area may be cut off when the booklet is marked.

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

QUESTION ONE

(a) A piece of copper metal was placed in a silver nitrate solution and left for 24 hours.

Copper metal in silver nitrate solution

Time: 0 hours Time: 24 hours later

https://fineartamerica.com/featured/two-glass-flasks-of-copper-coils-dorling-kindersleyuig.html?product=metal-print

(i) Describe the observations that you would make at the **beginning** and **end** of the 24 hour period.

Link your observations to the reactants and products of the reaction.

(ii) State the type of reaction and justify your choice.

Include the activity series in your answer.

Type of reaction: _____

Justification: _____

(iii) Write a balanced ionic equation for the reaction occurring.

Balanced ionic equation:

(b) Sodium hydroxide solution was added to a solution of magnesium nitrate.

You may refer to the resource booklet.

(i) State the type of reaction that would occur.

(ii) Describe any observations that would be seen, and link them to the reactants and products involved.

(iii) Write a balanced ionic equation for the reaction occurring.

Balanced ionic equation:

QUESTION TWO

Metal nitrate solutions were mixed with three solutions containing sodium ions (sodium iodide, sodium carbonate, and sodium hydroxide). For some combinations, reactions were observed; for others there was no reaction.

(a) Complete the following table:

- State 'Yes' or 'No' as to whether a reaction has occurred.
- If 'Yes', write the colour, name, and chemical formula of the precipitate in the correct box.

You may use the solubility rules and colours of selected ions and solids provided in the resource booklet.

Solutions	Sodium iodide	Sodium carbonate	Sodium hydroxide
Calcium nitrate			
Lead nitrate			
Copper nitrate			

(b) Elaborate on the reaction occurring between sodium iodide and lead nitrate.

In your answer, you should:

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

Balanced ionic equation:

(c) Magnesium carbonate and magnesium hydroxide are both white solids that can be distinguished from each other in the school laboratory using decomposition reactions and simple tests.

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

In your answer, you should:

- explain the procedure that would be carried out, including tests that could be used to confirm the products formed
- describe any observations that would be seen and link them to the reactants and products involved
- support your answer with balanced symbol equations for the decomposition reactions.

Balanced symbol equations:

QUESTION THREE

Some chemical reactions are listed in the following table:

Reaction A	A piece of magnesium metal is held in a blue Bunsen burner flame.
Reaction B	Zinc metal is placed into a beaker containing magnesium sulfate solution.
Reaction C	Iron wool is heated in the presence of chlorine gas.

(a) (i) Name the types of reaction occurring.

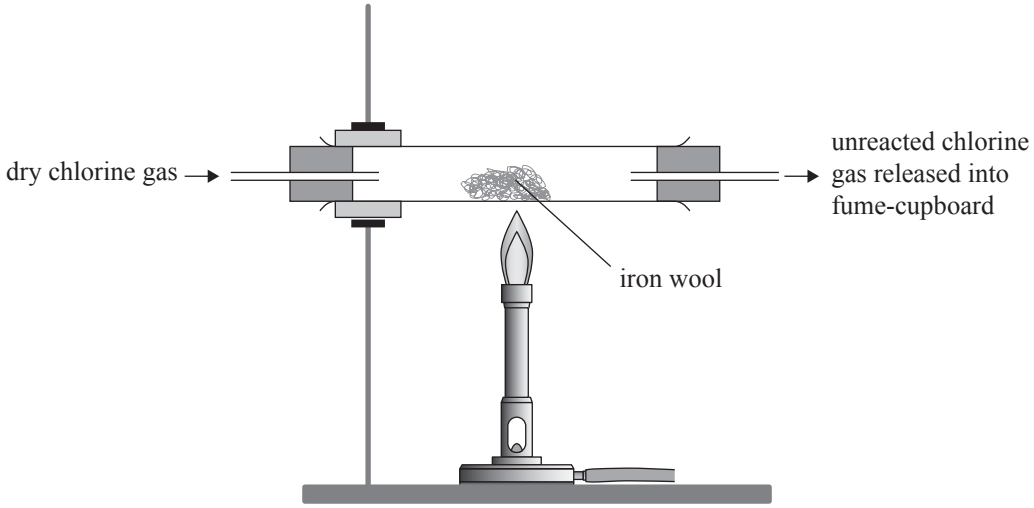
	Reaction Type
Reaction A	
Reaction B	
Reaction C	

(ii) Explain your answer for Reaction A.
Include a balanced symbol equation.

Reaction A balanced symbol equation:

(iii) Explain your answer for Reaction B.

(b) In Reaction C, iron wool is heated in the presence of chlorine gas forming a brown solid. The reaction can be carried out with the following apparatus set-up:



Adapted from: https://edu.rsc.org/experiments/halogen-reactions-with-iron-wool/804.article

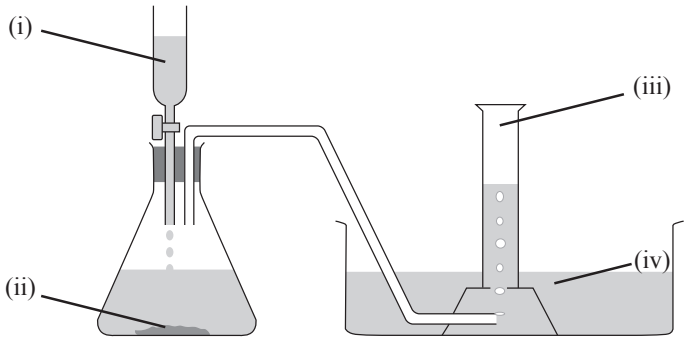
Elaborate on the reaction occurring.

In your answer, you should:

- link observations to the species involved, and explain any electron transfer occurring
- write a balanced symbol equation for the reaction.

Balanced symbol equation:

(c) Hydrogen peroxide is added to manganese dioxide in a flask. The following diagram is an apparatus set-up that could be used to carry out this reaction and isolate one of the products.



Adapted from: www.tutormyself.com/edexcel-igcse-2017chem-316/

Identify the substances (i) – (iv) that are involved in the procedure shown in the diagram above:

(i) _____

(ii) _____

(iii) _____

(iv) _____

(v) Explain how the gaseous product isolated in the above reaction could be tested for in the school laboratory.

In your answer, you should:

- state the type of reaction occurring to produce the gaseous product
- justify your choice of the type of reaction
- explain, including observations, how the gas can be identified.

Type of reaction: _____

Justification and identification of gaseous product: _____

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

QUESTION NUMBER

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QUESTION NUMBER

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