

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
TWENTY FIRST CENTURY SCIENCE  
ADDITIONAL APPLIED SCIENCE A**

**A335/02**

Unit 4: Harnessing Chemicals (Higher Tier)

Candidates answer on the Question Paper  
A calculator may be used for this paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**

- Pencil
- Ruler (cm/mm)

**Wednesday 16 June 2010  
Morning**

**Duration: 45 minutes**



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **12** pages. Any blank pages are indicated.

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Answer **all** the questions.

1 This question is about silver chloride, which is an insoluble salt.

(a) Name one other chemical, which is insoluble.

..... [1]

(b) Use words from this list to complete the sentences about the formation of silver chloride.

**distillation**                  **filtration**                  **precipitate**                  **solution**                  **solvent**

Dilute hydrochloric acid is added to silver nitrate .....

Silver chloride is formed as a .....

The silver chloride is removed (separated) by .....

[3]

(c) Complete the word equation for the reaction between sodium chloride and silver nitrate.

sodium chloride + silver nitrate  $\Rightarrow$  silver chloride + .....

[1]

(d) A chemical catalogue lists 100g bottles of silver nitrate at two different prices.

Suggest why there are two different prices.

Explain your answer.

.....

..... [2]

(e) Emma makes silver nitrate in the laboratory.

Her teacher tells her that the theoretical yield of dry silver nitrate should be 2.0g.

She finds that the actual yield of dry silver nitrate is 1.3g.

Calculate Emma's **percentage yield**.

You must show your working.

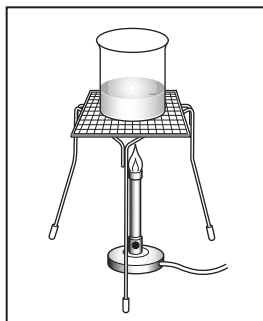
percentage yield = ..... [2]

[Total: 9]

Turn over

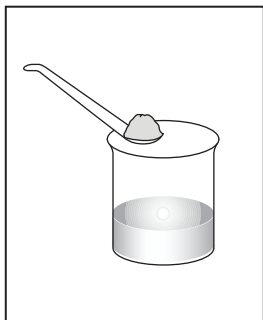
2 Imran follows a standard procedure to make some magnesium sulfate crystals.

**Step 1**



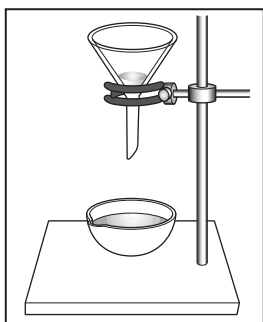
Warm 100 cm<sup>3</sup> of dilute sulfuric acid.

**Step 2**



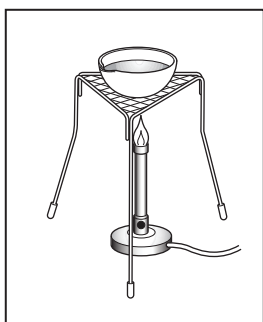
Whilst stirring, add magnesium oxide a bit at a time until it is in excess.

**Step 3**



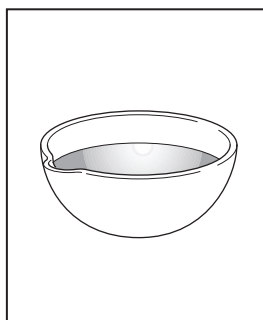
Filter the mixture into an evaporating dish.

**Step 4**



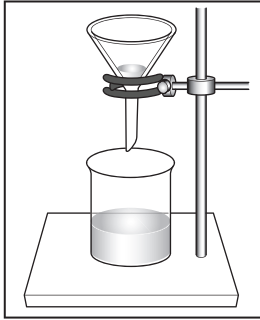
Gently heat to evaporate some of the water, until crystals start to form.

**Step 5**



Leave to cool.

Step 6



Remove small white crystals by filtration.

(a) Step 1 says to warm the sulfuric acid.

Suggest why.

.....  
 ..... [1]

(b) Step 2 says to add magnesium oxide until it is in excess.

Suggest why.

.....  
 ..... [1]

(c) Explain why it is necessary to filter the mixture in step 3.

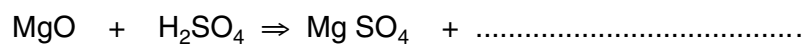
.....  
 .....  
 ..... [2]

(d) Imran wants to make **larger** crystals of magnesium sulfate.

Suggest how the standard procedure could be changed to do this.

.....  
 ..... [1]

(e) Complete the symbol equation for the reaction between magnesium oxide and sulfuric acid.



[1]

[Total: 6]

- 3 (a) Milk of magnesia is a suspension.

Explain what is meant by a **suspension**.

.....  
.....  
..... [1]

- (b) Milk of magnesia contains magnesium hydroxide.

(i) Give the chemical formula of magnesium hydroxide.

..... [2]

(ii) The label on the bottle says that milk of magnesia contains 0.4 g of magnesium hydroxide in 5 ml of suspension.

Calculate how many grams of magnesium hydroxide there are in **1 litre** of suspension.

You must show your working.

..... g/l [2]

(c) People suffering from indigestion can take milk of magnesia.

(i) Complete the following sentence.

The magnesium hydroxide in the milk of magnesia ..... the hydrochloric acid in the stomach to give ..... and water. [2]

(ii) In an experiment to test some milk of magnesia, it was added a bit at a time to hydrochloric acid in a beaker.

Describe how the pH of the liquid in the beaker changes during the course of the experiment.

.....  
.....  
..... [2]

[Total: 9]

4 (a) Chemical reactions usually either give out heat or take in heat.

Complete the following sentence.

A chemical reaction that **takes in heat** is called an ..... reaction. [1]

(b) Explain what is meant by the term **rate of a chemical reaction**.

.....  
.....  
..... [2]

(c) The rate of some chemical reactions can be increased by increasing the temperature.

Explain why this happens in terms of **particles** present in the reaction.

.....  
.....  
.....  
..... [3]

[Total: 6]



5 Potassium chloride is used in very low concentrations to treat some medical conditions.

The concentrations are shown in parts per million (ppm).

(a) Sam has a solution of potassium chloride that contains 0.9 grams of potassium chloride per litre of solution.

Calculate the concentration of his solution in **parts per million (ppm)**.

You must show your working.

concentration of potassium chloride = ..... ppm [2]

(b) An aqueous solution of potassium chloride is made in the laboratory by dissolving potassium chloride in a small quantity of water in a beaker.

The dissolved potassium chloride is then transferred to a 100 cm<sup>3</sup> graduated flask and water added until the solution is up to the 100 cm<sup>3</sup> mark.

(i) What is meant by the term **aqueous**?

.....  
..... [1]

(ii) Name the **solute** in this procedure.

..... [1]

(iii) How can you make sure that all of the potassium chloride is transferred from the beaker into the flask?

.....  
..... [1]

(c) When potassium chloride solution is being manufactured, the safety of the workers is important.

Name the organisation responsible in the UK for the regulations covering the safety of workers in the chemical industry.

..... [1]

[Total: 6]

END OF QUESTION PAPER

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