

<b>Candidate Forename</b>		<b>Candidate Surname</b>	
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<b>Centre Number</b>						<b>Candidate Number</b>				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**A335/01**

**TWENTY FIRST CENTURY SCIENCE  
ADDITIONAL APPLIED SCIENCE A**

**Harnessing Chemicals (Foundation Tier)**

**MONDAY 18 JANUARY 2010: Morning**

**DURATION: 45 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**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)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **Write your answer to each question in the space provided, however additional paper may be used if necessary.**

## **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.**

**BLANK PAGE**

Answer ALL the questions.

1 Emma reads a book about metals and their reactions.

(a) She finds the chemical symbols for some metals.  
Draw a straight line from each METAL to its  
correct CHEMICAL SYMBOL.

METAL

CHEMICAL SYMBOL

calcium

Na

magnesium

Mg

potassium

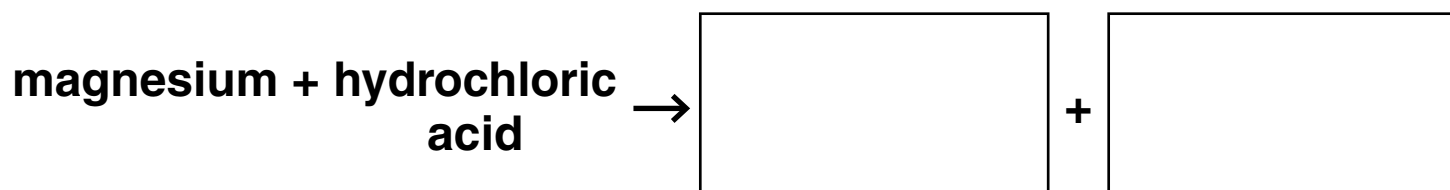
Ca

sodium

K

[3]

- (b) Emma reacts magnesium with hydrochloric acid.  
Complete the word equation for the reaction  
between magnesium and hydrochloric acid.



[2]

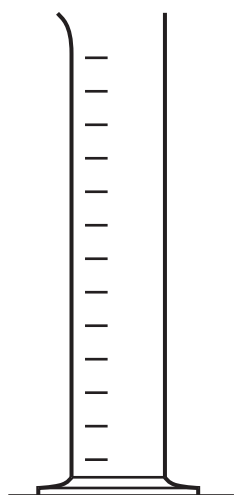
- (c) Emma uses 5 g of magnesium to react with her hydrochloric acid.  
She finds from a website that 100 g of magnesium costs £20.00.  
Calculate the cost of 5 g of magnesium.

Show your working.

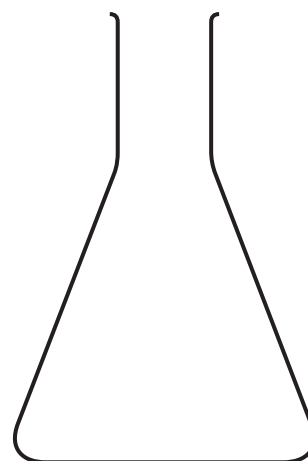
cost of 5 g of magnesium = \_\_\_\_\_ [2]

[Total: 7]

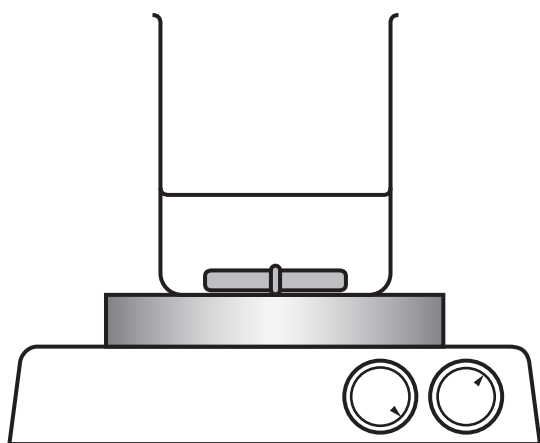
2 Chemists use the apparatus shown below.



**A**



**B**



**C**



**D**

- (a) Name the apparatus A, B, C and D.  
Use words from the list.

BALANCE

GRADUATED FLASK

BURETTE

MAGNETIC STIRRER

CONICAL FLASK

MEASURING CYLINDER

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_

[4]

- (b) Which piece of apparatus would you use to ACCURATELY measure out small volumes of a liquid?

Put a ring around the correct answer.

A

B

C

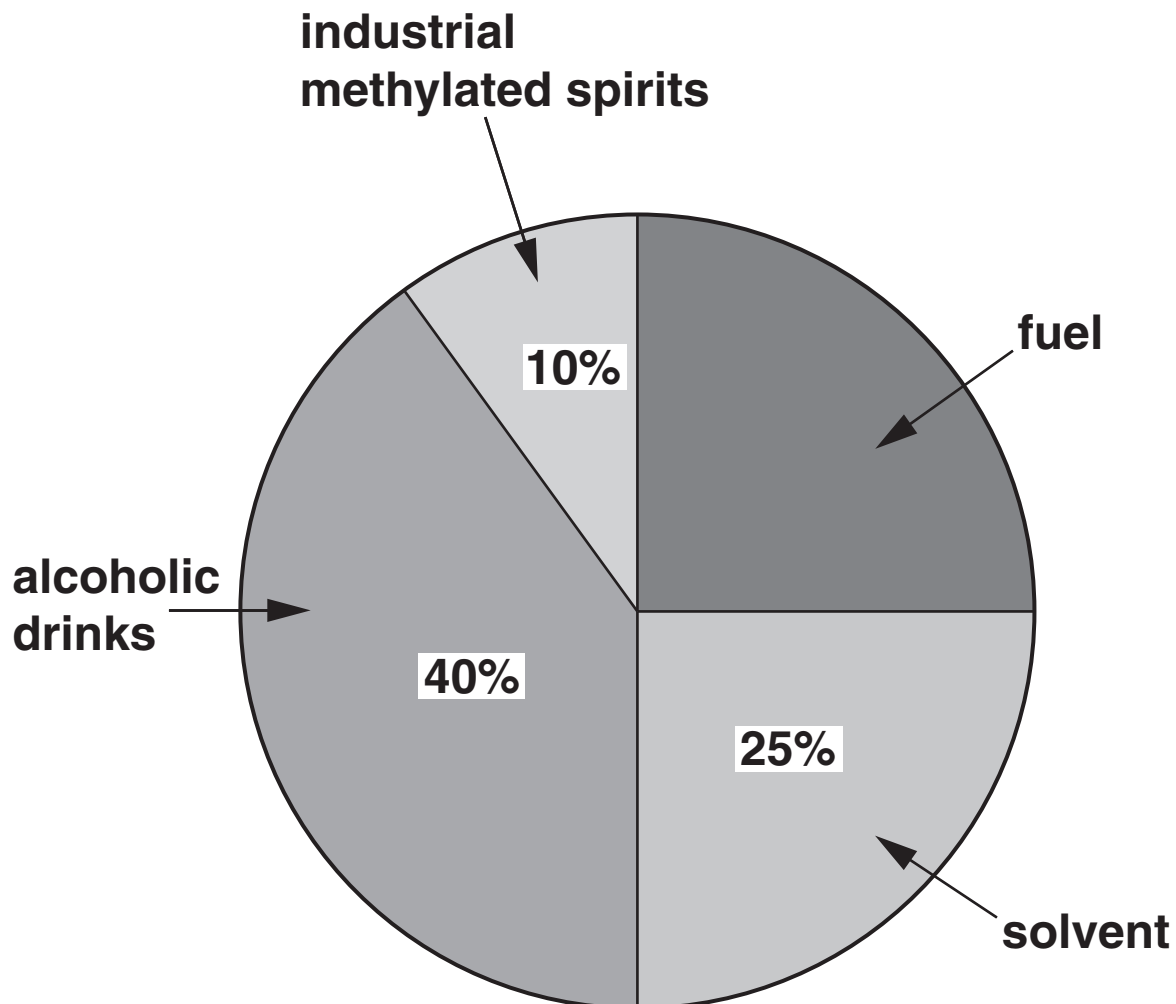
D

[1]

[Total: 5]

**3 Ethanol has many different uses.**

**(a) Sam finds this chart that shows some of the uses of ethanol.**



**Use the chart to find the percentage (%) used as fuel.**

\_\_\_\_\_ % [1]



**(b) Ethanol has the chemical formula  $C_2H_5OH$ .**

**(i) How many DIFFERENT ELEMENTS are there in the chemical formula of ethanol?**

\_\_\_\_\_ [1]

**(ii) What is the total number of ATOMS in the chemical formula of ethanol?**

\_\_\_\_\_ [1]

**(c) Ethanol is an organic compound. Organic compounds contain carbon and come from living or non-living sources.**

**Write down the chemical name of ANOTHER organic compound.**

\_\_\_\_\_ [1]

- (d) Ethanol is commonly made by the fermentation of sugar cane.  
This is a sustainable process.

Put a tick (✓) in the box next to the answer that **BEST** explains this as a sustainable process.

It produces little waste.

It makes use of renewable resources.

It makes a cheap product.

[1]

- (e) Use words from this list to complete the sentences about ethanol.

A METAL

A CARBOXYLIC ACID

AN ESTER

DISTILLING

FILTERING

REFLUXING

Ethanol can be turned into \_\_\_\_\_ .

This is done by \_\_\_\_\_ it for some

time with \_\_\_\_\_ .

[3]

[Total: 8]

- 4 (a) Ammonia is an alkaline gas.  
It dissolves in water to give a solution.

What will be the pH of this solution?

Put a ring around the correct answer.

LESS THAN 7

7

GREATER THAN 7

[1]

- (b) Ammonia is manufactured on a large scale.

- (i) What word is used to describe chemicals manufactured on a large scale?

Put a ring around the correct word.

BULK

FINE

LABORATORY

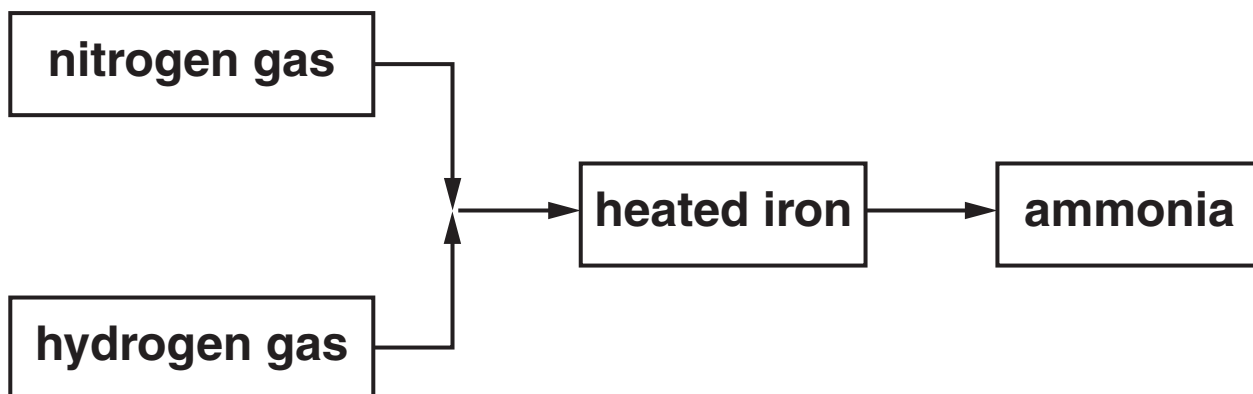
SPECIALITY

[1]

- (ii) Write down the name of ANOTHER chemical that is manufactured on a large scale.

\_\_\_\_\_ [1]

**(c) Ammonia is made by passing nitrogen gas and hydrogen gas over heated iron.**



**(i) The iron is a catalyst for the reaction.  
Explain what is meant by the term CATALYST.**

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[2]

**(ii) Nitrogen for this reaction is extracted from the air.  
Explain the advantage of using nitrogen from the air to manufacture ammonia.**

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[2]

(iii) The reaction is exothermic.  
What is meant by the term EXOTHERMIC?

\_\_\_\_\_ [1]

(d) Use a word from the list to complete the sentence about nitrogen.

ARTIFICIAL

INORGANIC

ORGANIC

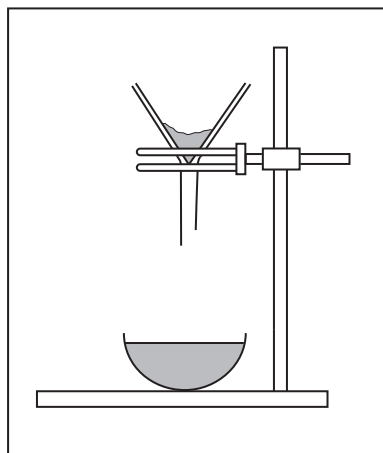
Nitrogen is an \_\_\_\_\_ chemical.  
[1]

[Total: 9]

- 5 (a) Amina follows a standard procedure to make magnesium sulfate crystals from magnesium oxide.

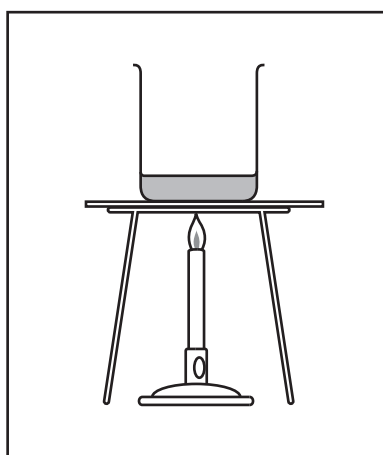
Amina uses the following steps.  
The steps are in the WRONG order.

STEP A



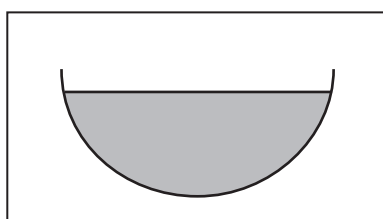
filter the mixture into an evaporating dish

STEP B



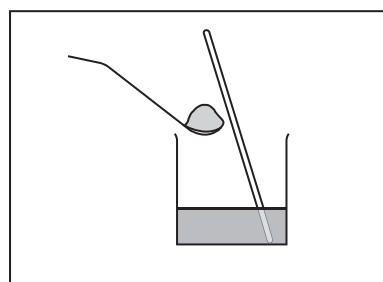
warm 100 cm<sup>3</sup> of dilute sulfuric acid

STEP C



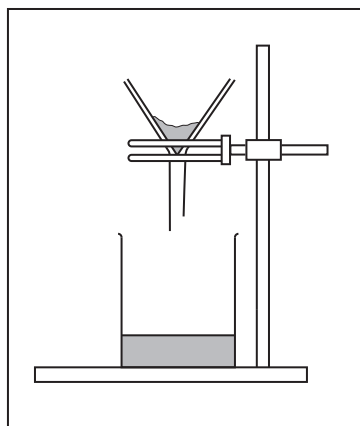
leave to cool

STEP D



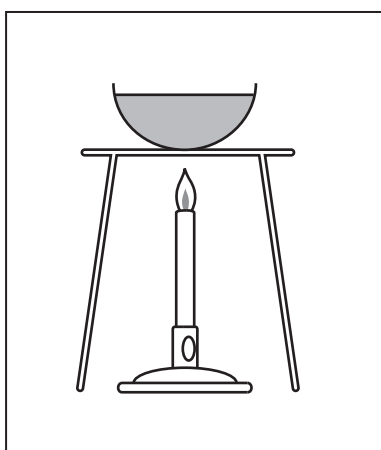
stir and add magnesium oxide a bit at a time until it is in excess

**STEP E**



**remove small white crystals of magnesium sulfate by filtration**

**STEP F**



**gently heat, to evaporate some of the water, until crystals start to form**

- (i) Write down the steps in the correct order. The first one has been done for you.**

<b>B</b>					
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**[4]**

- (ii) Why is the sulfuric acid warmed in STEP B?**

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**[1]**

- (iii) Why is the mixture filtered in STEP A?**

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**[1]**

**(b) Amina wants to make larger crystals of magnesium sulfate.**

**How could the standard procedure be changed to do this?**

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**[1]**

**[Total: 7]**

**END OF QUESTION PAPER**



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