OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE ADDITIONAL APPLIED SCIENCE A

A335/01

Harnessing Chemicals (Foundation Tier)

OCE/12927

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)

Monday 18 January 2010
Morning

Duration: 45 minutes

A3350 1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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, 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**.
- This document consists of **12** pages. Any blank pages are indicated.

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.

magnesium + **hydrochloric acid** → ☐ + ☐

[2]

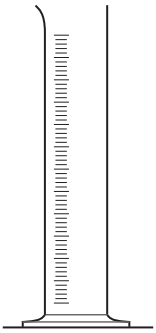
(c) Emma uses 5 g of magnesium to react with her hydrochloric acid.
She finds from a website that 100 g of magnesium costs £20.00.
Calculate the cost of 5 g of magnesium.

Show your working.

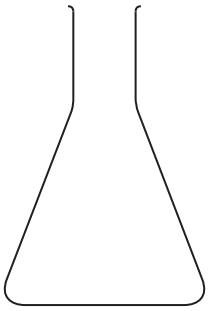
cost of 5 g of magnesium = ... **[2]**

[Total: 7]

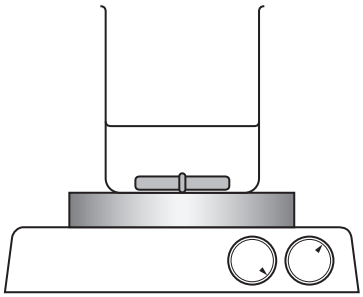
2 Chemists use the apparatus shown below.



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?

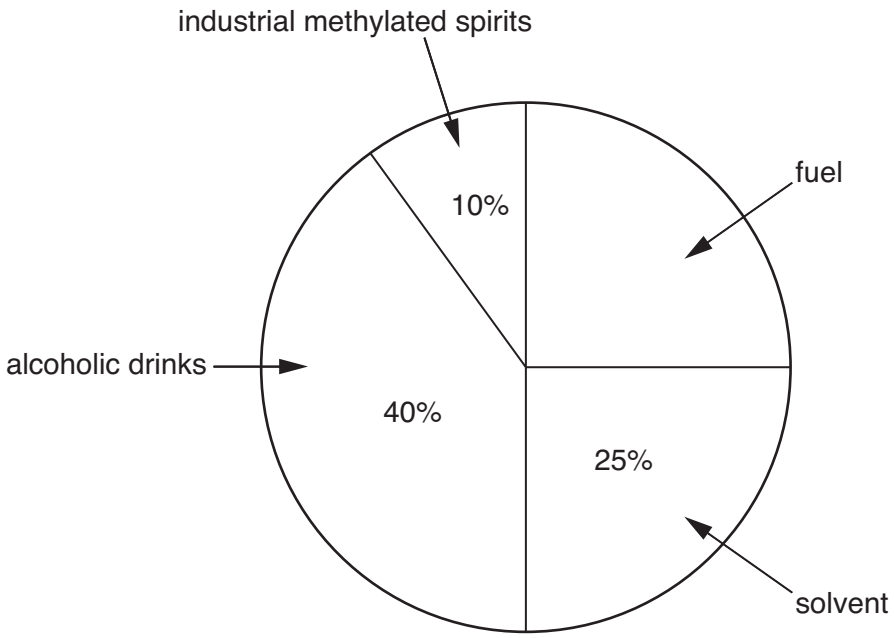
Put a (ring) around the correct answer.

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.

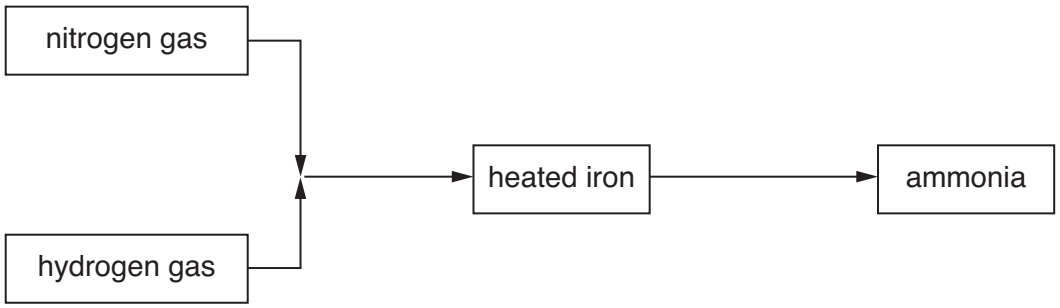
bulk **fine** **laboratory** **speciality**

[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**.

.....

.....

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

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

.....

.....

..... **[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**

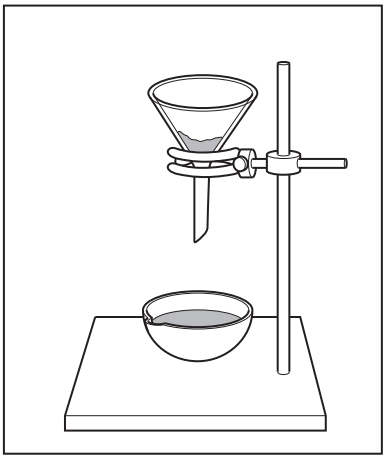
Nitrogen is an ..... chemical. **[1]**

[Total: 9]

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

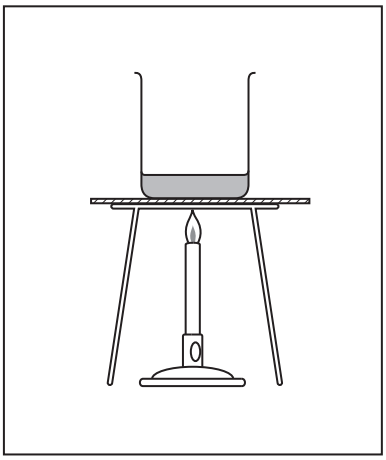
Amina uses the following steps.
The steps are in the **wrong** order.

step A



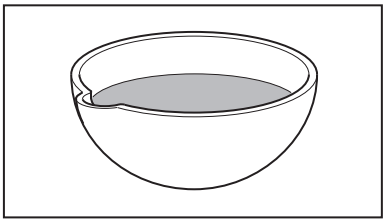
filter the mixture into an evaporating dish

step B



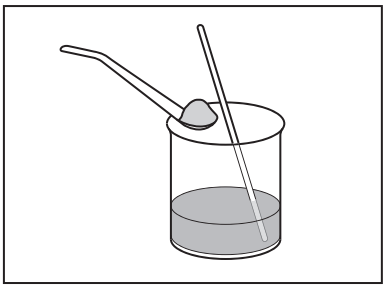
warm 100 cm^3 of dilute sulfuric acid

step C



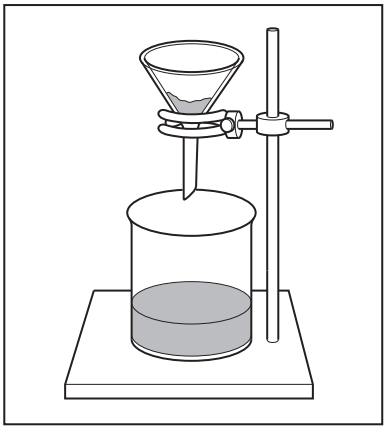
leave to cool

step D



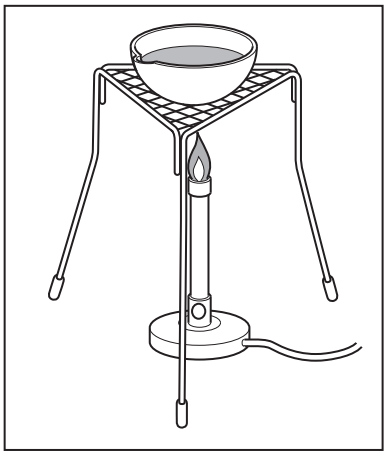
stir and add magnesium oxide a bit at a time until it is in excess

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					

[4]

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

.....

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

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

.....

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

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

How could the standard procedure be changed to do this?

.....

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

[Total: 7]

END OF QUESTION PAPER

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