

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A
Harnessing Chemicals (Foundation Tier)

A335/01

Monday 17 January 2011
Morning

Duration: 45 minutes

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)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- 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).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

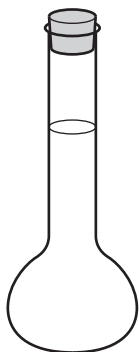
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **12** pages. Any blank pages are indicated.

BLANK PAGE

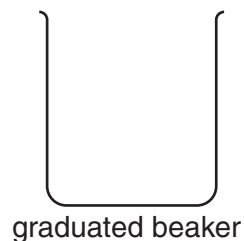
PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

1 Chemists use the apparatus shown below.

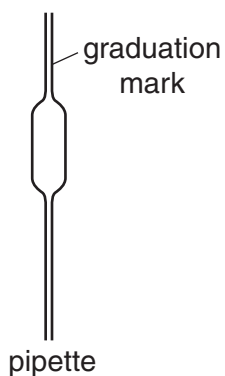


A



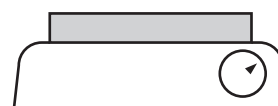
graduated beaker

B

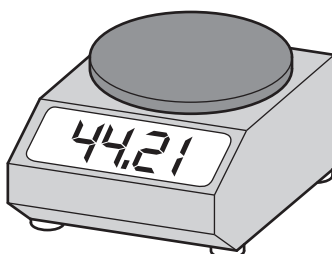


pipette

C



D



E

Choose from **A**, **B**, **C**, **D** and **E** to answer the following questions.

(a) Which diagram shows a balance?

answer [1]

(b) Which piece of apparatus is used for heating liquids?

answer [1]

(c) Which **two** pieces of apparatus are used to measure an amount of liquid **accurately**?

answer and [2]

[Total: 4]

Turn over

2 It takes a long time to develop a new medicine.

There are many different stages to go through.

(a) Draw a straight line from the name of each stage to the best description of that stage.

name of stage	description of stage
quality assurance	new compounds invented and tested
laboratory testing	chosen compounds tested on patients
clinical testing	industrial chemists design a method for scaling up to a manufacturing process
process development	chemists check that chemicals used and products meet necessary standards

[3]

(b) Ibuprofen is a medicine that was developed in this way.

The formula of ibuprofen is $C_{13}H_{18}O_2$.

(i) How many different elements are there in the formula of ibuprofen?

answer [1]

(ii) What is the **total** number of atoms in the formula of ibuprofen?

answer [1]

(c) Ibuprofen is made on a small scale.

What term is used to describe this type of chemical?

Put a tick (✓) in the box next to the correct answer.

bulk

fine

rare

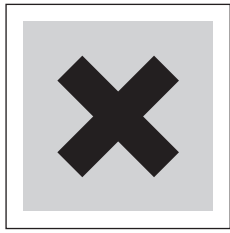
small

[1]

[Total: 6]

- 3 Substances that are hazardous to health should have a hazard symbol clearly shown on the container.

(a) The diagrams labelled **A**, **B**, **C**, **D** and **E** each show a different hazard symbol



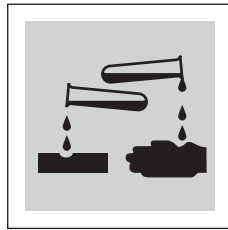
A



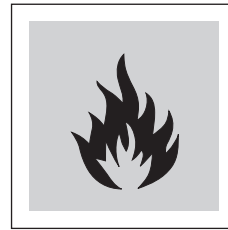
B



C



D



E

Write one letter, **A**, **B**, **C**, **D** or **E**, in each of the boxes below to show which hazard symbol goes with each hazard.

The first one has been done for you.

toxic

oxidising

irritant

corrosive

[3]

- (b) The Government has strict regulations to control the storage and transport of chemicals.

Suggest **two** reasons why.

.....

.....

..... [2]

- (c) Name the organisation in the UK that is responsible for the regulation of risks to health and safety arising from the manufacture and use of chemicals.

..... [1]

[Total: 6]

4 Minesh and Sam investigate the rate of chemical reactions.

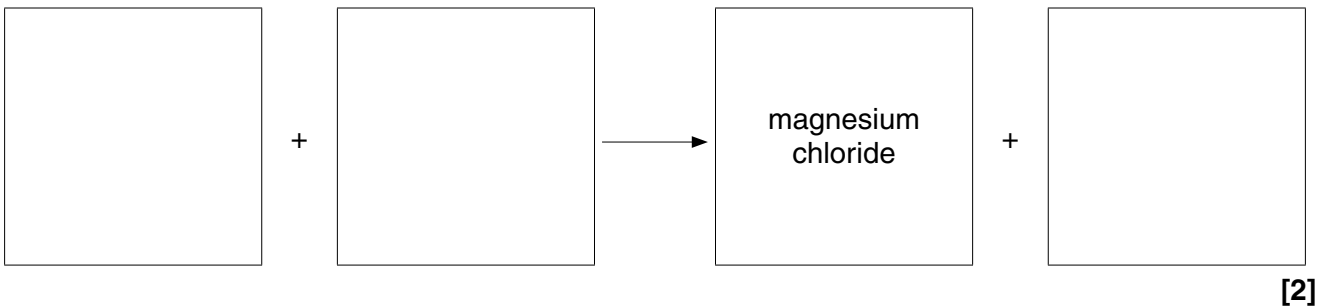
(a) What is meant by the term **rate** of a chemical reaction?

.....

 [2]

(b) They use the reaction between hydrochloric acid and magnesium.

Complete the word equation for this reaction.



(c) Minesh says that this reaction is exothermic.

(i) What does **exothermic** mean?

.....
 [1]

(ii) How could Sam check that the reaction was exothermic?

.....
 [1]

[Total: 6]

5 Malachite is a pigment that is used in the manufacture of paint.

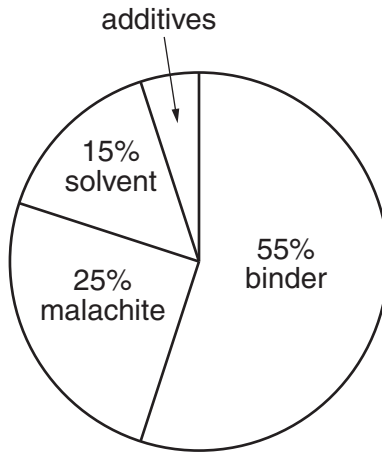
(a) Malachite is an inorganic chemical.

Put a tick (✓) in the box next to the statement which describes an inorganic chemical.

- It is obtained from living sources.
- It is obtained from non-living sources.
- It is obtained from never-lived sources.

[1]

(b) This pie chart shows that gloss paint contains malachite and other chemicals.



Use the pie chart to find the percentage of additives in the paint.

answer% [1]

(c) The paint industry carries out tests on each batch of paint before it is sold.

Suggest **two** reasons why they do this.

.....

.....

..... [2]

(d) The solvent used in the manufacture of paint is an example of a bulk chemical.

What is a **bulk** chemical?

..... [1]

[Total: 5]

6 Peter prepares an aqueous solution of sodium chloride using the following steps.

The steps are in the wrong order.

step **A** Stopper the graduated flask and mix well.

step **B** Transfer the sodium chloride solution into a 100 cm³ graduated flask.

step **C** Dissolve the sodium chloride in a small amount of water.

step **D** Accurately weigh 2.5 g of solid sodium chloride and transfer to a beaker.

step **E** Rinse the beaker with water and add to the graduated flask.

step **F** Add water carefully until the solution in the flask is up to the 100 cm³ mark.

(a) Write down the steps in the correct order.

The first and last ones have been done for you.

D **A**

[3]

(b) It is important that the sodium chloride solution is transferred to the graduated flask without any spillage.

Describe **two** ways step **B** can be carried out to avoid any spillage of the solution.

.....

 [2]

(c) Name the **solute** used in this procedure.

..... [1]

(d) Name the **solvent** used in this procedure.

..... [1]

- (e) 100 ml of the solution contains 2.5 g of sodium chloride.

Calculate the concentration of the solution in grams per litre (g/l).

Show your working.

$$\text{concentration (g/l)} = \frac{\text{mass (g)}}{\text{volume (l)}}$$

concentration = g/l [2]

[Total: 9]

END OF QUESTION PAPER

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