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GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE ADDITIONAL APPLIED SCIENCE A

A335/01

Unit 4: Harnessing Chemicals (Foundation Tier)

OCE/18066

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

A335 01

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. 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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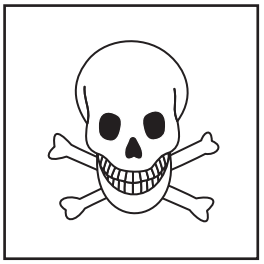
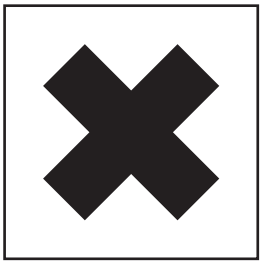
Answer **all** the questions.

1 Chemists use hazchem symbols to clearly identify the hazards of individual chemicals.

(a) Draw a straight line from each **hazard name** to the correct **hazard symbol**.

hazard name	**hazard symbol**
corrosive	
harmful	
toxic	
oxidising	

[3]

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(b) Hazchem signs on tankers also display codes.

These tell the emergency services what the tanker contains and how to clear any spillage.

It is important that the emergency services have this information if there is a spillage.

Explain why.

.....

.....

.....

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

[Total: 5]

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2 Sulfuric acid is an important chemical that is made on a large scale.

(a) It is important in the large scale manufacture of sulfuric acid that the health and safety of the workers is protected.

Which organisation in the UK regulates this?

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

(b) Sulfuric acid is made on a large scale.

Put a (ring) round the word that best describes the chemical sulfuric acid.

bulk **fine** **speciality**

[1]

(c) The chemical formula of sulfuric acid is H_2SO_4.

(i) How many different **elements** are shown in this formula?

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

(ii) What is the **total** number of **atoms** shown in the formula, H_2SO_4?

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

(d) Sulfuric acid is used in the reaction between an alcohol and a carboxylic acid to make an ester.

(i) The sulfuric acid is used to speed up the reaction.

Put a (ring) round the word that best describes the use of sulfuric acid in this reaction.

catalyst **endothermic** **reactant** **solute**

[1]

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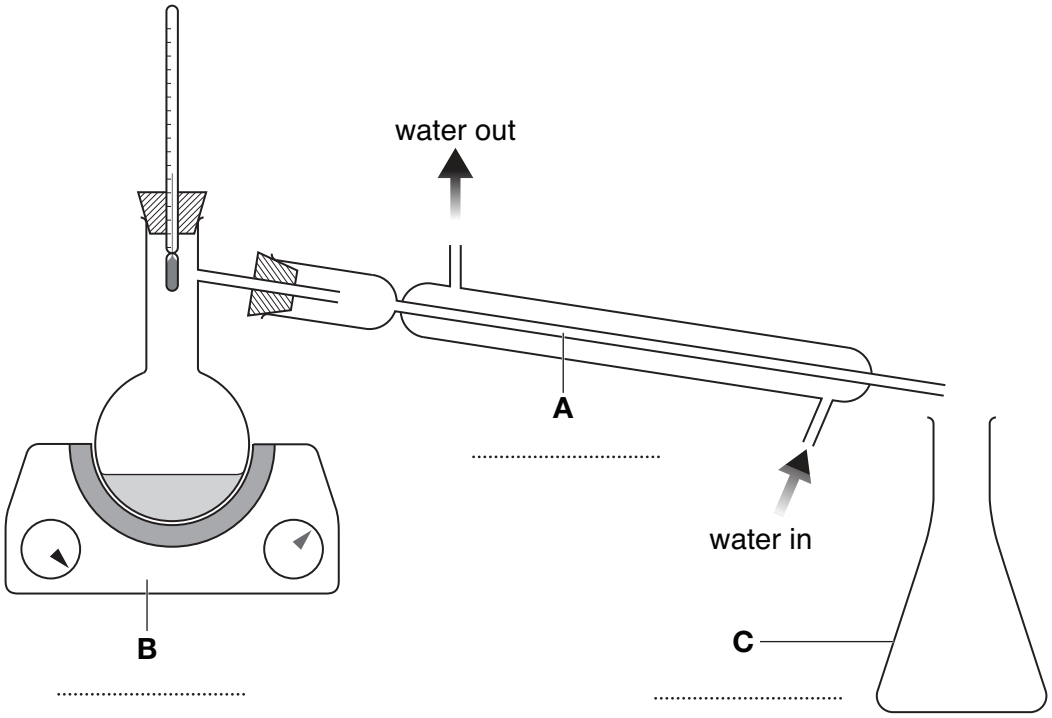
(ii) The following diagram shows the apparatus used for making the ester.



Use words from the following list to complete the labels, **A**, **B** and **C**, on the diagram.

beaker **condenser** **flask** **heating mantle** **magnetic stirrer**

[3]

[Total: 8]

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3 Milk of magnesia is a suspension used for curing indigestion.

(a) (i) Explain what is meant by a **suspension**.

.....

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

(ii) Give **one** other example of a suspension.

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

(b) Milk of magnesia contains magnesium hydroxide. Magnesium hydroxide is a **compound** made from sea salts.

Put a tick (✓) in the box next to the **best** description of magnesium hydroxide.

inorganic, from a never-lived source	☐
inorganic, from a living source	☐
organic, from a never-lived source	☐
organic, from a living source	☐

[1]

(c) The magnesium hydroxide used for milk of magnesia must be very pure.

Explain why.

.....

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

(d) A sample of 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.

..... grams per litre **[2]**

[Total: 7]

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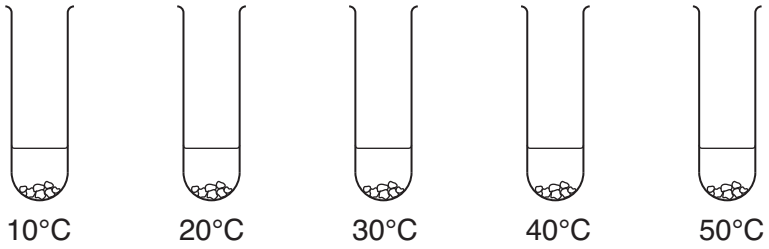
4 Chemists need to know how quickly reactions take place.

Sam carries out experiments with marble chips (calcium carbonate) and dilute hydrochloric acid.

The diagrams show the experiments he carried out.



Each boiling tube contains the same mass of marble chips.

The marble chips are all the same size.

Each tube also contains the same amount of hydrochloric acid.

(a) How does **increasing** the temperature affect the rate of this reaction?

.....

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

(b) Sam repeats the experiment at 10° C twice more. Each time Sam changes **one** of the conditions.

(i) Sam uses the same mass of smaller sized marble chips.

How will this affect the rate of reaction? Explain your answer.

.....

.....

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

(ii) Sam replaces some of the hydrochloric acid with water before adding the marble chips.

How will this affect the rate of reaction?

.....

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

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(c) Calcium carbonate reacts with hydrochloric acid.

(i) Complete the following word equation for this reaction.

calcium carbonate	+	hydrochloric acid	⇒	calcium chloride	+		+	

[2]

(ii) The reaction between calcium carbonate and hydrochloric acid is exothermic.

What does **exothermic** mean?

.....

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

[Total: 7]

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5 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 ⇒ silver chloride + ...

[1]

(d) A chemical catalogue lists 100 g 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 2.0 g.
She finds that the actual yield of dry silver nitrate is 1.3 g.

Calculate Emma's **percentage yield**.
You must show your working.

percentage yield = ... **[2]**

[Total: 9]

END OF QUESTION PAPER

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