

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

0245/01

**SCIENCE
FOUNDATION TIER
CHEMISTRY 3**

A.M. TUESDAY, 29 January 2013

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	5	
2.	5	
3.	5	
4.	8	
5.	6	
6.	6	
7.	4	
8.	7	
9.	4	
Total	50	

0245
010001

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

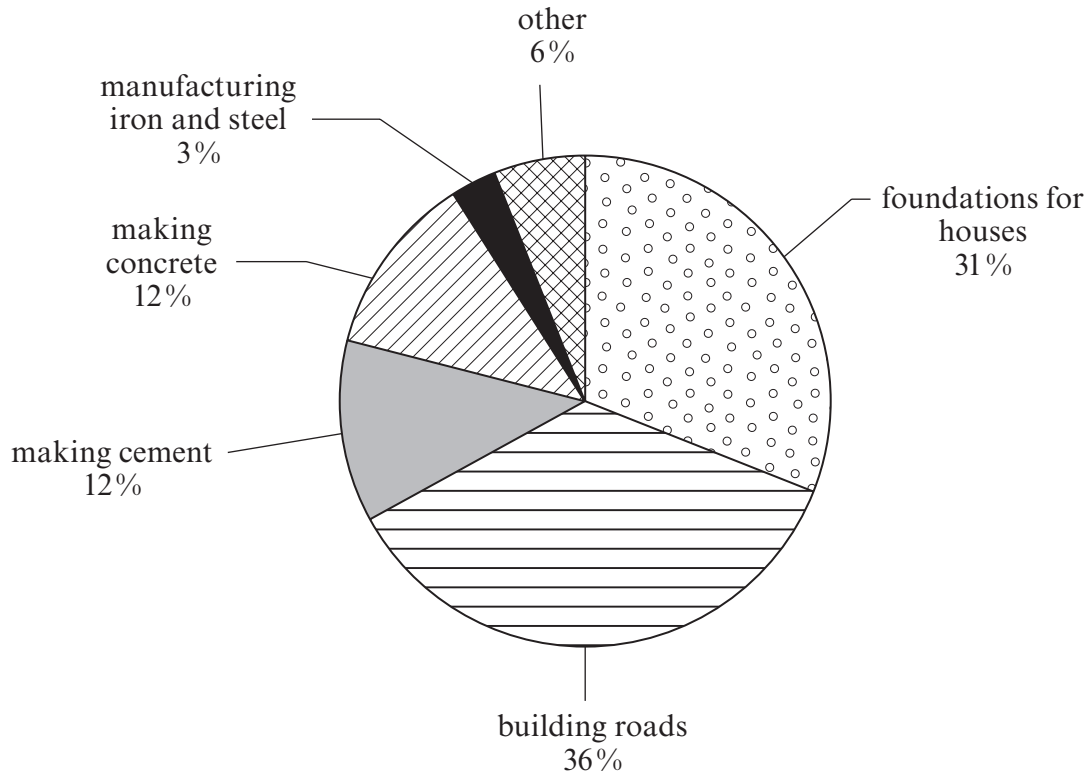
The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The Periodic Table is printed on the back cover of the examination paper and the formulae for some common ions on the inside of the back cover.

Answer **all** questions.

1. (a) The pie chart below shows some of the major uses of limestone.



Use the pie chart to answer parts (i) and (ii).

(i) Give the percentage of limestone used to make cement. [1]

..... %

(ii) Which use accounts for the largest amount of limestone? [1]

.....

(b) The box below contains some statements about the effects of limestone quarrying.

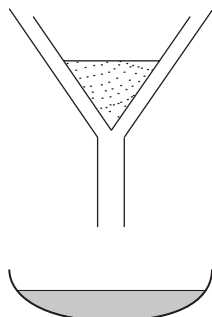
creates more wealth for the community	disfigures the landscape
dust from lorries and blasting	more jobs locally
noise from blasting	provides materials for the building industry

Choose from the box above the **three** statements which give the advantages of limestone quarrying. [3]

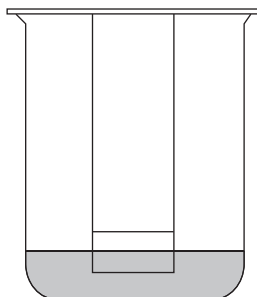
1.
2.
3.

5

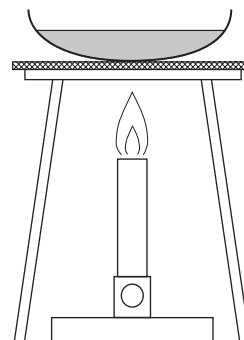
2. The diagrams below show three methods used to separate mixtures.



Method A



Method B



Method C

(a) Identify the correct name for each of methods **A**, **B** and **C** from the following box. [3]

chromatography

distillation

evaporation

filtration

A

B

C

(b) Give the letter, **A**, **B** or **C**, of the method you would use to

(i) separate coloured dyes,

[1]

(ii) remove an insoluble substance from a solution.

[1]

3. The table below shows information about three substances.

propane	$ \begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \\ & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{H} \\ & & & & \\ & \text{H} & \text{H} & \text{H} & \end{array} $	C_3H_8
ethanol	$ \begin{array}{ccccccc} & \text{H} & & \text{H} & & & \\ & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - \text{O} & - \text{H} \\ & & & & & & \\ & \text{H} & & \text{H} & & & \end{array} $	$\text{C}_2\text{H}_5\text{OH}$
propene	$ \begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \\ & & & & \\ \text{H} & - \text{C} & = \text{C} & - \text{C} & - \text{H} \\ & & & & \\ & & & \text{H} & \end{array} $	C_3H_6

Use the information to answer parts (a) and (b).

(a) (i) Name the substance represented by C_3H_8 [1]

(ii) Give the **structural** formula for ethanol. [1]

(iii) Give the **molecular** formula for propene. [1]

(b) Name the substance which is an example of

(i) an alkane, [1]

(ii) an alcohol. [1]

4. (a) The three main stages in the manufacture of sulphuric acid are as follows.

Stage 1 Sulphur reacts with oxygen to form sulphur dioxide

Stage 2 $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$

Stage 3 Sulphur trioxide is absorbed into concentrated sulphuric acid and then diluted to various concentrations

(i) Name the **raw material** which provides oxygen gas. [1]

(ii) Write the **word** equation for the reaction occurring in stage 2. [2]

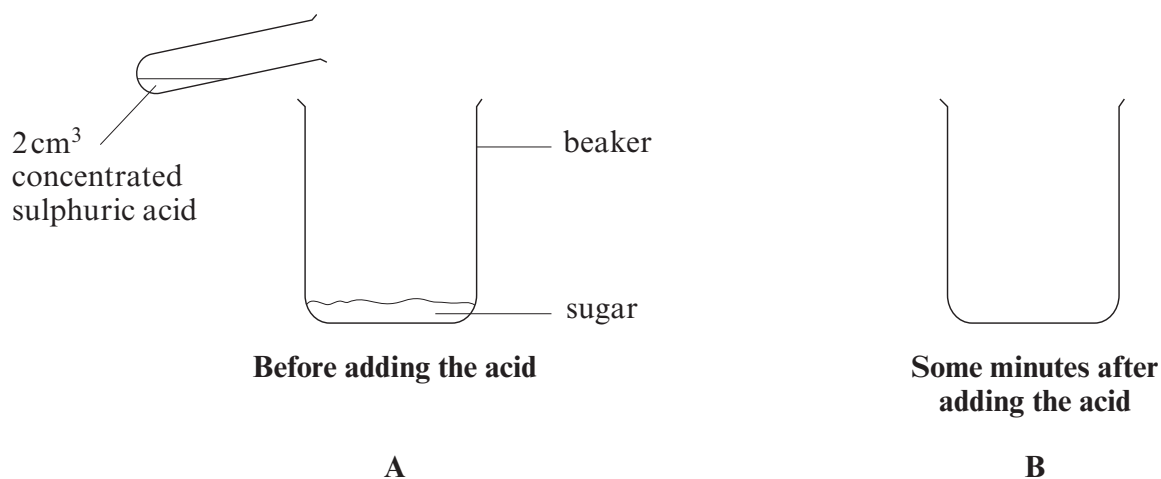
..... + \rightleftharpoons

(iii) Vanadium(V) oxide is used in stage 2 to speed up the reaction.

Give the term used to describe a substance which speeds up a reaction. [1]

.....

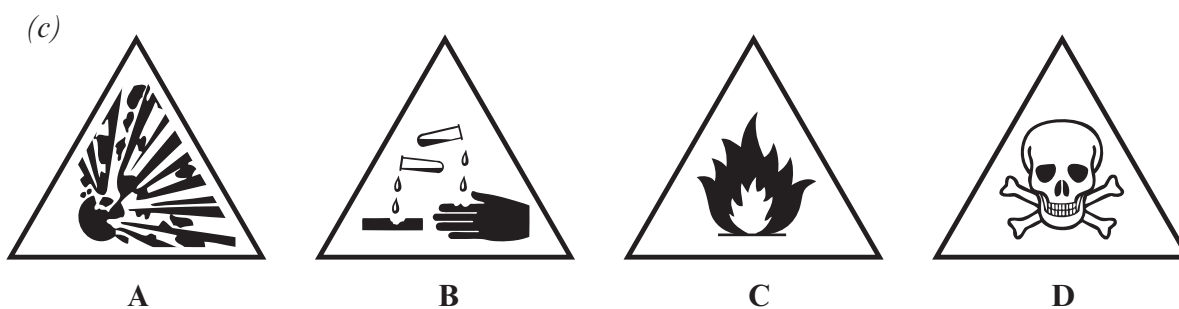
- (b) When concentrated sulphuric acid is added to sugar a violent reaction takes place, forming carbon, C, and steam, H_2O .



(i) Complete diagram **B** above showing what is seen some minutes after adding the concentrated sulphuric acid. [1]

(ii) Give the names of the **two elements** removed from sugar during the reaction. [1]

..... and



- (i) Which of the hazard symbols above would you expect to see on a bottle of concentrated sulphuric acid in a laboratory? [1]

.....

- (ii) State **one** safety precaution required when handling concentrated sulphuric acid. [1]

.....

5. (a) The tables below show some tests that can be used to identify unknown substances.

Positive ion	Test used to identify ion	Result
sodium, Na ⁺	flame test	yellow flame
potassium, K ⁺	flame test	lilac flame
calcium, Ca ²⁺	flame test	brick-red flame
copper, Cu ²⁺	add sodium hydroxide solution	blue precipitate
iron(II), Fe ²⁺	add sodium hydroxide solution	green precipitate
magnesium, Mg ²⁺	add sodium hydroxide solution	white precipitate

Negative ion	Test used to identify ion	Result
carbonate, CO ₃ ²⁻	add dilute hydrochloric acid	bubbles formed
sulphate, SO ₄ ²⁻	add dilute hydrochloric acid followed by barium chloride solution	white precipitate
chloride, Cl ⁻	add dilute nitric acid followed by silver nitrate solution	white precipitate

Use only the information in the tables to answer parts (i) and (ii).

- (i) Edward carried out the two tests needed to identify a compound thought to be copper chloride. Complete the table below by noting the expected result. [2]

Test used to identify ion	Result
add sodium hydroxide solution	
add dilute nitric acid followed by silver nitrate solution	

- (ii) Jelena carried out the two tests needed to identify a compound thought to be sodium carbonate. Complete the table below by noting the expected result. [2]

Test used to identify ion	Result
flame test	
add dilute hydrochloric acid	

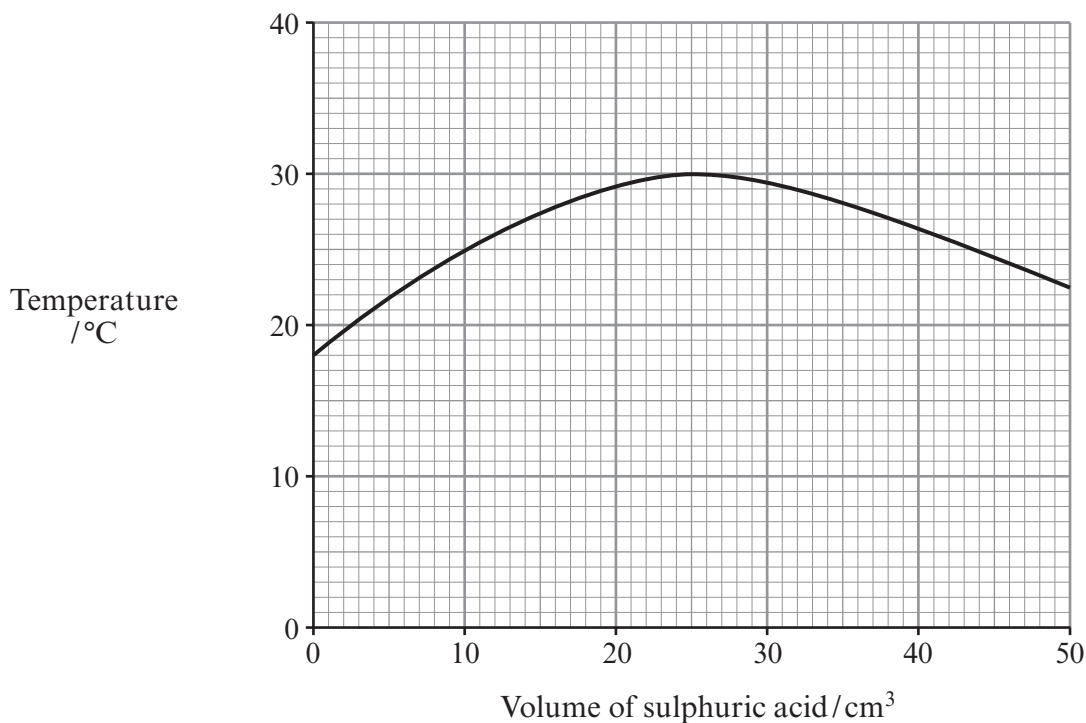
(b) Draw a line from each gas to the test you would use to identify it.

[2] Examiner
only

Gas	Test
ammonia	pops with a lighted splint
	relights a glowing splint
	turns limewater milky
oxygen	turns damp red litmus paper blue

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6. The graph below shows the temperature recorded when 50 cm³ of dilute sulphuric acid solution was added, 1 cm³ at a time, to 20 cm³ of sodium carbonate solution.



- (a) Use the graph to give the
- temperature of the sodium carbonate solution **before** any sulphuric acid was added, [1]
..... °C
 - maximum temperature reached during the reaction, [1]
..... °C
 - volume of sulphuric acid needed to use up all the sodium carbonate. [1]
..... cm³
- (b) (i) Insert the names of **three** products to complete the **word** equation for the reaction between sulphuric acid and sodium carbonate. [2]



- (ii) Give the chemical formula of the salt formed during the reaction. [1]

.....

7. The fire triangle can be used to explain how fires start and how they can be put out. Use your knowledge of the fire triangle to describe and explain **two** methods which are used to put out large forest fires. [4]

.....

.....

.....

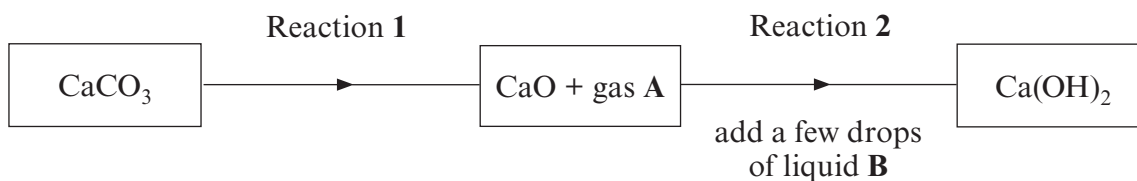
.....

.....

.....

4

8. (a) The flow diagram below shows the reactions used to prepare slaked lime, Ca(OH)₂, from limestone, CaCO₃.



- (i) I Briefly describe what needs to be done to limestone for reaction 1 to take place. [1]

- II Give the name for the type of reaction taking place. [1]

- (ii) Name gas A. [1]

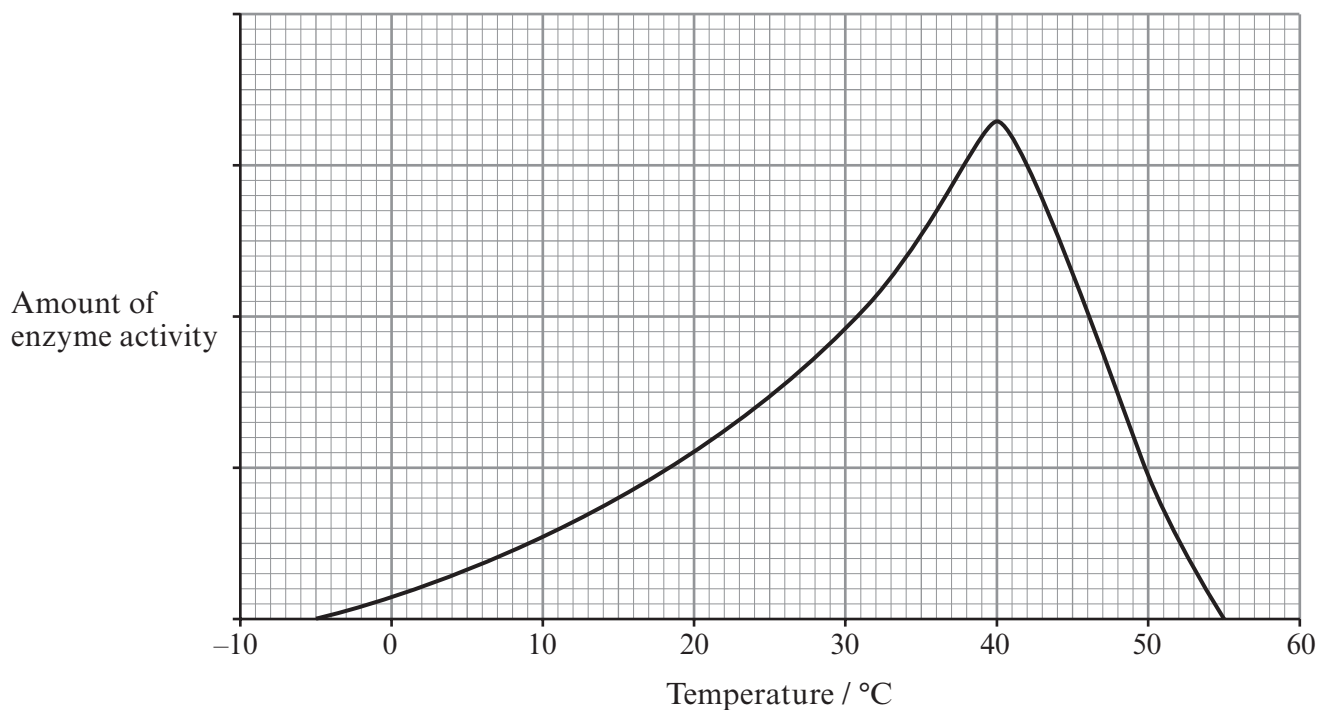
- (iii) Name liquid B. [1]

- (b) Write a balanced **symbol** equation for the reaction which takes place when slaked lime, Ca(OH)₂, is neutralised by hydrochloric acid, HCl. [3]



7

9. The temperature range in which enzyme activity occurs can be different for different enzymes. The graph below shows the amount of activity of an enzyme, **A**, over a temperature range.



- (a) Use the graph to give the temperature range where the enzyme activity is **increasing**. [1]
 °C to °C
- (b) Sketch carefully the graph of the amount of enzyme activity of a different enzyme, **B**, which is active between 5°C and 50°C and has the greatest activity at 30°C. [2]
- (c) Give a temperature value at which **both** enzymes would be destroyed. [1]
 °C

END OF PAPER

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FORMULAE FOR SOME COMMON IONS

POSITIVE IONS		NEGATIVE IONS	
Name	Formula	Name	Formula
Aluminium	Al^{3+}	Bromide	Br^-
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	Cl^-
Calcium	Ca^{2+}	Fluoride	F^-
Copper(II)	Cu^{2+}	Hydroxide	OH^-
Hydrogen	H^+	Iodide	I^-
Iron(II)	Fe^{2+}	Nitrate	NO_3^-
Iron(III)	Fe^{3+}	Oxide	O^{2-}
Lithium	Li^+	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+}		
Nickel	Ni^{2+}		
Potassium	K^+		
Silver	Ag^+		
Sodium	Na^+		
Zinc	Zn^{2+}		

