

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

0245/01

**SCIENCE CHEMISTRY  
FOUNDATION TIER  
CHEMISTRY 3**

A.M. MONDAY, 21 May 2012

45 minutes

**Suitable for Modified  
Language Candidates**

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

**ADDITIONAL MATERIALS**

In addition to this paper you will need 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.

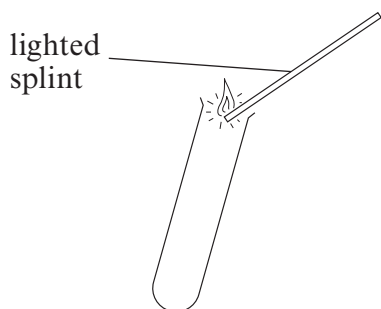
You are reminded of the necessity for good English and orderly presentation in your answers.

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) Choose a gas from the box below to answer the question.

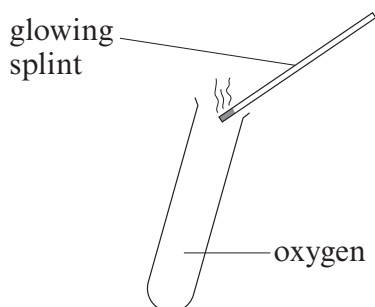
ammonia	chlorine	hydrogen	sulphur dioxide
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When a lighted splint was introduced into a gas a 'pop' was heard.

Name the gas. .... [1]

- (b) A glowing splint was introduced into a test tube of oxygen.  
What would you expect to happen? [1]

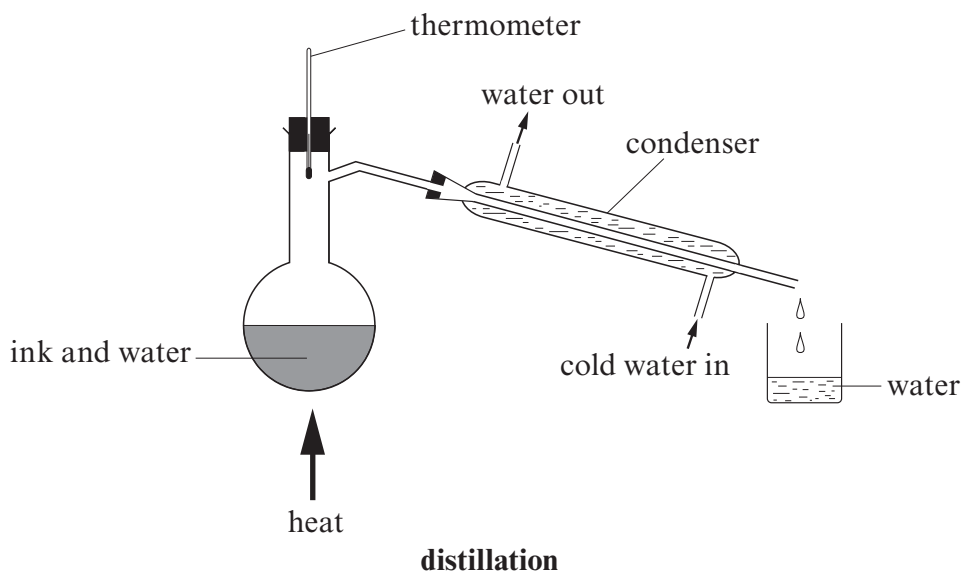
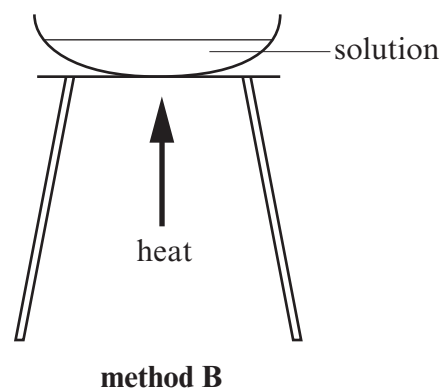
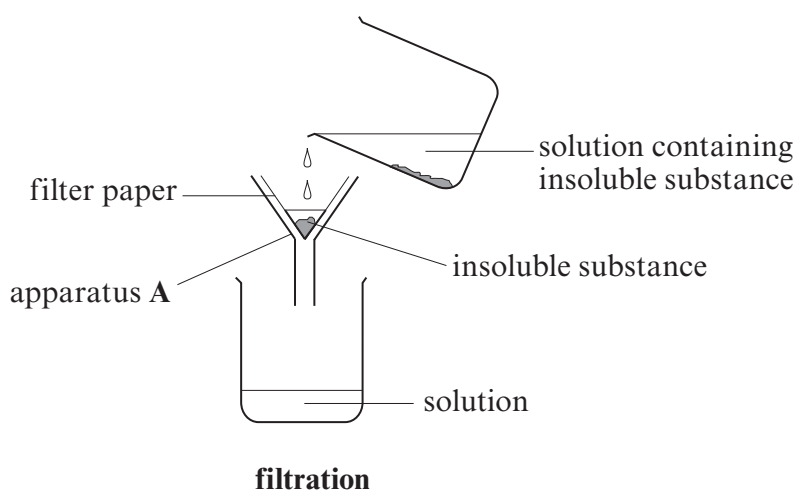


.....  
.....

- (c) A flame test was carried out on a sample of sodium chloride.  
Place a tick (✓) in the box which gives the colour seen during the flame test. [1]

lilac	
green	
red	
yellow	

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



(a) Name apparatus A.

[1]

.....

(b) Give the name of method B.

[1]

.....

(c) You have been given a mixture of sand, salt and water.

(i) Name the method used to remove sand from the mixture.

[1]

.....

(ii) Name the method used to obtain water from the mixture.

[1]

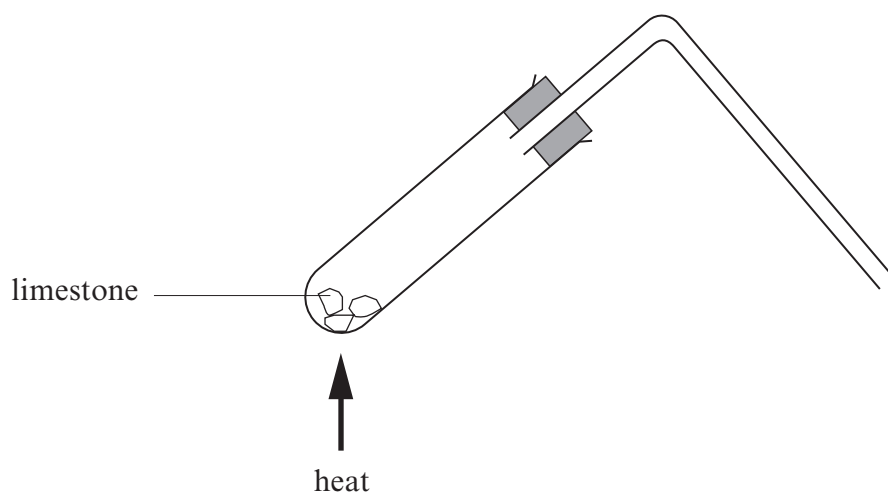
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3. (a) Limestone has lots of uses.  
Place a tick (✓) in the box next to the **two** uses of limestone.

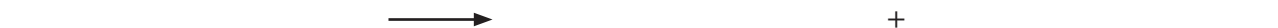
[2]

making bleach	<input type="checkbox"/>
making cement	<input type="checkbox"/>
making soap	<input type="checkbox"/>
the extraction of aluminium	<input type="checkbox"/>
the extraction of iron	<input type="checkbox"/>

- (b) The following diagram shows some of the apparatus that can be used to show the effect of heat on limestone. Limestone is made of calcium carbonate. During heating a gas is given off. The gas is tested by passing it through limewater.



- (i) Complete the diagram showing the gas passing through limewater. [1]
- (ii) State what happens to the limewater. [1]
- .....
- (iii) Give the **word** equation for the reaction that takes place during heating. [2]



(c) Limestone occurs naturally and is obtained by quarrying.

Give **one** benefit and **one** drawback (disadvantage) of limestone quarrying. [2]

*Benefit* .....

.....

*Drawback* .....

.....

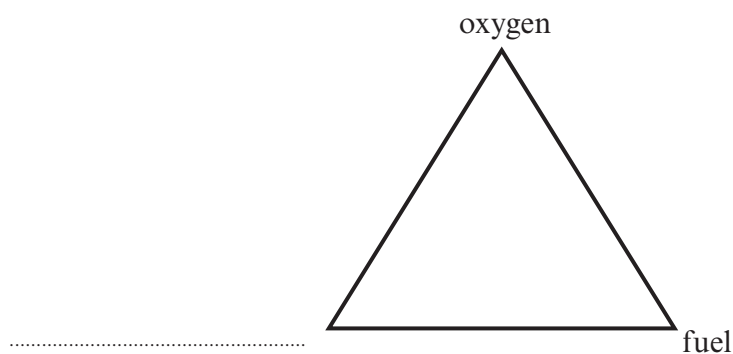
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4. (a) Use your knowledge of alkanes and trends in the data. Complete the following table.

[3]

Alkane	methane	ethane	propane	butane	pentane
Molecular formula	CH <sub>4</sub>	C <sub>2</sub> H <sub>6</sub>	.....	C <sub>4</sub> H <sub>10</sub>	C <sub>5</sub> H <sub>12</sub>
Boiling point / °C	-164	-87	-42	.....	36
State at 20 °C	gas	.....	gas	gas	liquid

- (b) The fire triangle can be used to explain how fires can be extinguished.

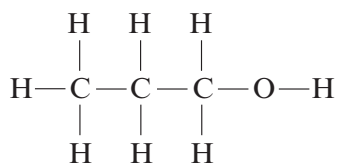


- (i) Complete the fire triangle. Name the missing factor in the diagram above. [1]
- (ii) A beaker of pentane caught fire in a laboratory. State how a teacher would extinguish the fire. [1]

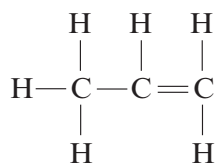
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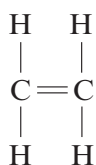
(c) The structural formulae of six organic compounds, A-F, are shown below.



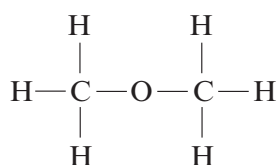
A



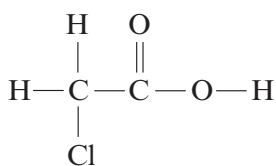
B



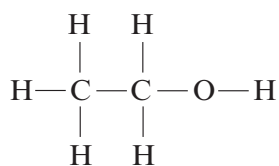
C



D



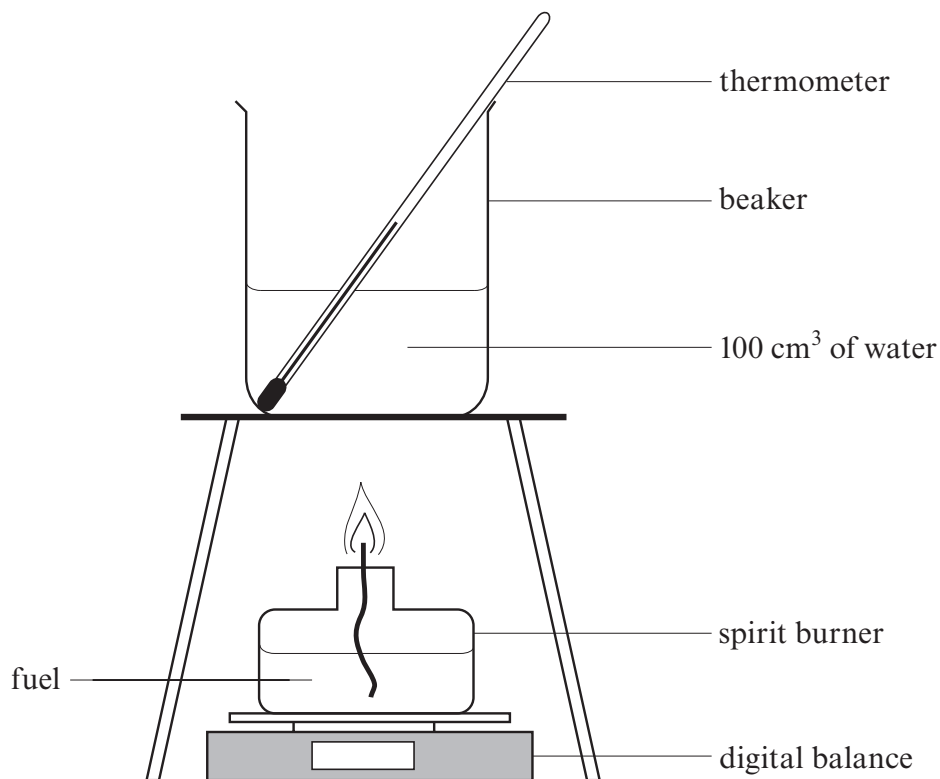
E



F

- (i) Give the letter, A-F, of the organic compound
- I. with a molecular formula of  $\text{C}_3\text{H}_6$ , ..... [1]
- II. which contains **four** different elements, ..... [1]
- III. with the same molecular formula as **D**. ..... [1]
- (ii) State the **molecular** formula of **C**. ..... [1]

5. Methanol and ethanol are both fuels. A group of students were asked to carry out an experiment to find out which was the better fuel. The apparatus used is shown in the following diagram. Their results are recorded in the table below.



Fuel	methanol	ethanol
Mass of spirit burner and fuel before heating / g	140.5	136.8
Mass of spirit burner and fuel after heating / g	140.0	136.3
Volume of water used / cm <sup>3</sup>	100	100
Temperature of water before heating / °C	20	21
Temperature of water after heating / °C	27	32



(a) Calculate the mass of ethanol burnt during the experiment.

[1]

Examiner  
only

(b) Give **two** ways in which the students made the experiment a fair test.

[2]

(c) State which is the better fuel. Give a reason for your answer.

[1]

(d) Burning this amount of ethanol should have given off enough heat to warm up  $100\text{ cm}^3$  of water by  $18^\circ\text{C}$ . Suggest **one** reason why the temperature of the water only increased by  $11^\circ\text{C}$ .

[1]

6. The three tables below show how some ions can be identified.

Positive ion	Action with sodium hydroxide solution
magnesium, $\text{Mg}^{2+}$	white precipitate
iron(II), $\text{Fe}^{2+}$	green precipitate
copper, $\text{Cu}^{2+}$	blue precipitate
sodium, $\text{Na}^+$	no visible change

Negative ion	Action with silver nitrate solution
chloride, $\text{Cl}^-$	white precipitate
bromide, $\text{Br}^-$	cream precipitate
iodide, $\text{I}^-$	yellow precipitate
carbonate, $\text{CO}_3^{2-}$	white precipitate

Negative ion	Action with dilute hydrochloric acid
chloride, $\text{Cl}^-$	no visible change
bromide, $\text{Br}^-$	no visible change
iodide, $\text{I}^-$	no visible change
carbonate, $\text{CO}_3^{2-}$	bubbles

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

- (a) A substance is suspected to be iron(II) iodide. State the **two** ions present and the tests you would carry out to identify these ions. Give the results of each test. [4]

*Ion 1* .....

*Test* .....

*Result* .....

*Ion 2* .....

*Test* .....

*Result* .....

- (b) An unknown solution, **X**, gave a white precipitate with silver nitrate solution and no precipitate with sodium hydroxide solution. When dilute hydrochloric acid was added bubbles were seen.

- (i) Give the **formulae** of the two ions present in **X**. [1]

..... and .....

- (ii) Give the **formula** of substance **X**. [1]

.....

7. The following table shows the colours of universal indicator at different pH values.

Colour	red	orange	yellow	green	blue	navy blue	purple
pH range	0-2	3-4	5-6	7	8-9	10-12	13-14

(a) A solution of coffee turns universal indicator yellow.

(i) Give the pH range of this solution. .... [1]

(ii) What does the pH range tells you about this solution? [1]

.....

(b) Ethanoic acid turns universal indicator orange. Sulphuric acid turns it red. What does this information tell you about the relative strengths of the two acids? [1]

.....

.....

(c) An *excess* of the strong alkali, sodium hydroxide, was added to a small amount of sulphuric acid. It also contained some universal indicator. What would happen to the pH of the solution? Give the final colour of the universal indicator. [2]

.....

.....

8. Wine is a solution containing about 13% ethanol. Ethanol is formed as glucose is broken down by the action of enzymes present in yeast.

(a) Give the name of this process. [1]

.....

(b) Give **one** *health* problem associated with too much use of alcohol over many years. [1]

.....

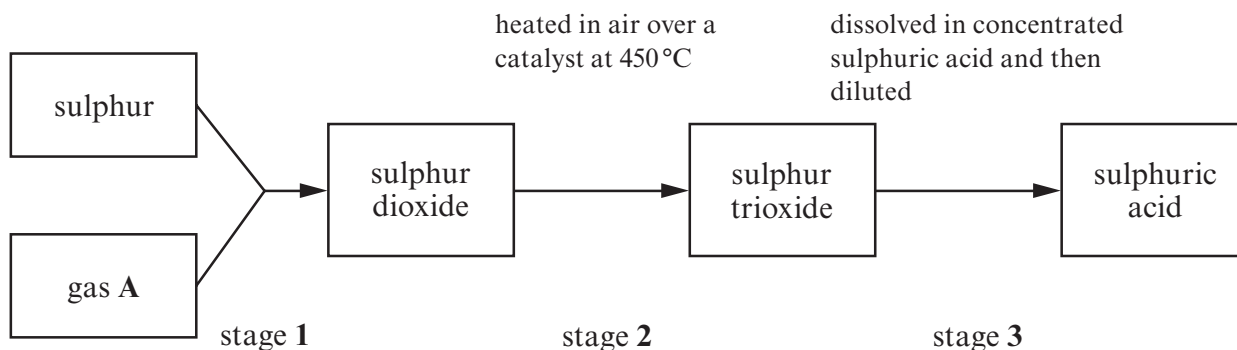
.....

(c) Give **one** *social* problem associated with alcohol misuse. [1]

.....

.....

9. (a) The following diagram shows a flow chart for the manufacture of sulphuric acid using the Contact Process.



- (i) Name gas A. .... [1]
- (ii) Give the **word** equation for the reaction taking place in stage 2. [2]



- (iii) Give the reason for using a catalyst in stage 2. [1]

- (iv) If sulphur trioxide is allowed to react with water directly in stage 3, a large quantity of heat is released. Give the term used for a reaction that produces heat. [1]

- (b) (i) When concentrated sulphuric acid is added to sugar,  $C_{12}H_{22}O_{11}$ , a black solid is formed. Give the **names** of the elements that are removed from sugar during this reaction. [1]

- (ii) The following hazard symbol is seen on a bottle of concentrated sulphuric acid.



What does it tell you about the acid? [1]

**FORMULAE FOR SOME COMMON IONS**

<b>POSITIVE IONS</b>		<b>NEGATIVE IONS</b>	
<b>Name</b>	<b>Formula</b>	<b>Name</b>	<b>Formula</b>
<b>Aluminium</b>	<b>Al<sup>3+</sup></b>	<b>Bromide</b>	<b>Br<sup>-</sup></b>
<b>Ammonium</b>	<b>NH<sub>4</sub><sup>+</sup></b>	<b>Carbonate</b>	<b>CO<sub>3</sub><sup>2-</sup></b>
<b>Barium</b>	<b>Ba<sup>2+</sup></b>	<b>Chloride</b>	<b>Cl<sup>-</sup></b>
<b>Calcium</b>	<b>Ca<sup>2+</sup></b>	<b>Fluoride</b>	<b>F<sup>-</sup></b>
<b>Copper(II)</b>	<b>Cu<sup>2+</sup></b>	<b>Hydroxide</b>	<b>OH<sup>-</sup></b>
<b>Hydrogen</b>	<b>H<sup>+</sup></b>	<b>Iodide</b>	<b>I<sup>-</sup></b>
<b>Iron(II)</b>	<b>Fe<sup>2+</sup></b>	<b>Nitrate</b>	<b>NO<sub>3</sub><sup>-</sup></b>
<b>Iron(III)</b>	<b>Fe<sup>3+</sup></b>	<b>Oxide</b>	<b>O<sup>2-</sup></b>
<b>Lithium</b>	<b>Li<sup>+</sup></b>	<b>Sulphate</b>	<b>SO<sub>4</sub><sup>2-</sup></b>
<b>Magnesium</b>	<b>Mg<sup>2+</sup></b>		
<b>Nickel</b>	<b>Ni<sup>2+</sup></b>		
<b>Potassium</b>	<b>K<sup>+</sup></b>		
<b>Silver</b>	<b>Ag<sup>+</sup></b>		
<b>Sodium</b>	<b>Na<sup>+</sup></b>		

