

FOR OFFICIAL USE

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**X012/101**

Section B Total Marks

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NATIONAL  
QUALIFICATIONS  
2008

FRIDAY, 30 MAY  
9.00 AM – 10.30 AM

CHEMISTRY  
INTERMEDIATE 1

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

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Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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Necessary data will be found in the Chemistry Data Booklet for Intermediate 1 and Access 3 (2007 Edition).

**Section A – Questions 1–20 (20 marks)**

Instructions for completion of **Section A** are given on page two.

For this section of the examination you must use an **HB pencil**.

**Section B (40 marks)**

All questions should be attempted.

The questions may be answered in any order but all answers are to be written in this answer book, **and must be written clearly and legibly in ink**.

Rough work, if any should be necessary, should be written in this book, and then scored through when the fair copy has been written. If further space is required, a supplementary sheet for rough work may be obtained from the invigilator.

Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the invigilator and should be inserted inside the **front** cover of this booklet.

Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.



### Read carefully

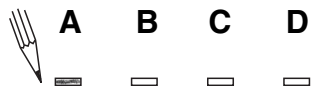
- 1 Check that the answer sheet provided is for **Chemistry Intermediate 1 (Section A)**.
- 2 For this section of the examination you must use an **HB pencil** and, where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate Number) and **Centre Name** printed on it.  
Do not change any of these details.
- 4 If any of this information is wrong, tell the Invigilator immediately.
- 5 If this information is correct, **print** your name and seat number in the boxes provided.
- 6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then, using your pencil, put a horizontal line in the space provided (see sample question below).
- 7 There is **only one correct** answer to each question.
- 8 Any rough working should be done on the question paper or the rough working sheet, **not** on your answer sheet.
- 9 At the end of the exam, put the **answer sheet for Section A inside the front cover of this answer book**.

### Sample Question

To show that the ink in a ball-pen consists of a mixture of dyes, the method of separation would be

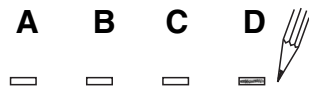
- A chromatography
- B fractional distillation
- C fractional crystallisation
- D filtration.

The correct answer is **A**—chromatography. The answer **A** has been clearly marked in **pencil** with a horizontal line (see below).



### Changing an answer

If you decide to change your answer, carefully erase your first answer and using your pencil, fill in the answer you want. The answer below has been changed to **D**.



## SECTION A

This section of the question paper consists of 20 multiple-choice questions.

1. Which hazard label would be used to show that an oven cleaner is **corrosive**?



A



B



C



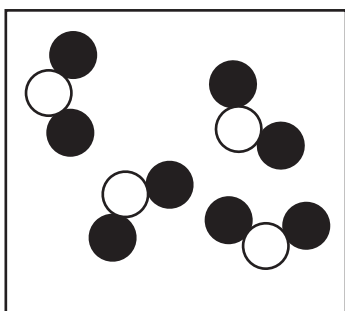
D

2. Which of the following is an example of a chemical reaction?

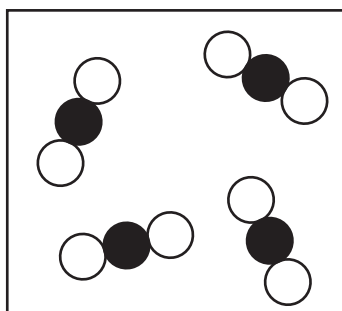
- A Petrol burning
- B Nail varnish drying
- C An ice cube melting
- D Sugar dissolving in tea

3. Which of the following diagrams represents a mixture?

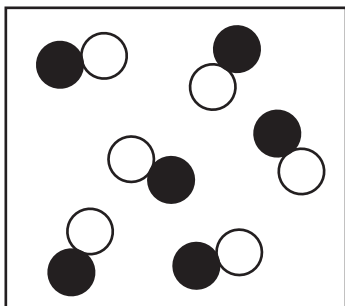
A



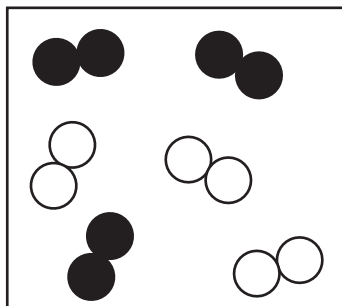
B



C



D



[Turn over

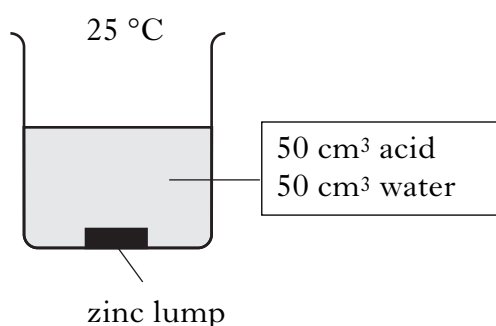
4. A student adds 1 gram of a catalyst to a reaction mixture.

Which line in the table shows what happens when the 1 gram of catalyst is added to the mixture?

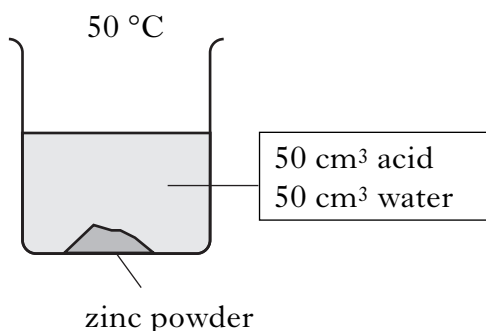
	Speed of reaction	Mass of catalyst left at end in grams
A	unchanged	1
B	faster	1
C	unchanged	0
D	faster	0

5. A student set up four experiments to investigate the reaction between zinc and dilute hydrochloric acid.

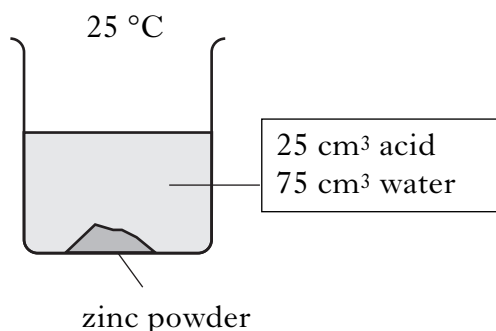
**Experiment 1**



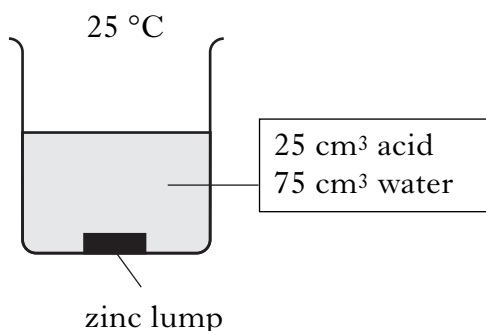
**Experiment 2**



**Experiment 3**



**Experiment 4**



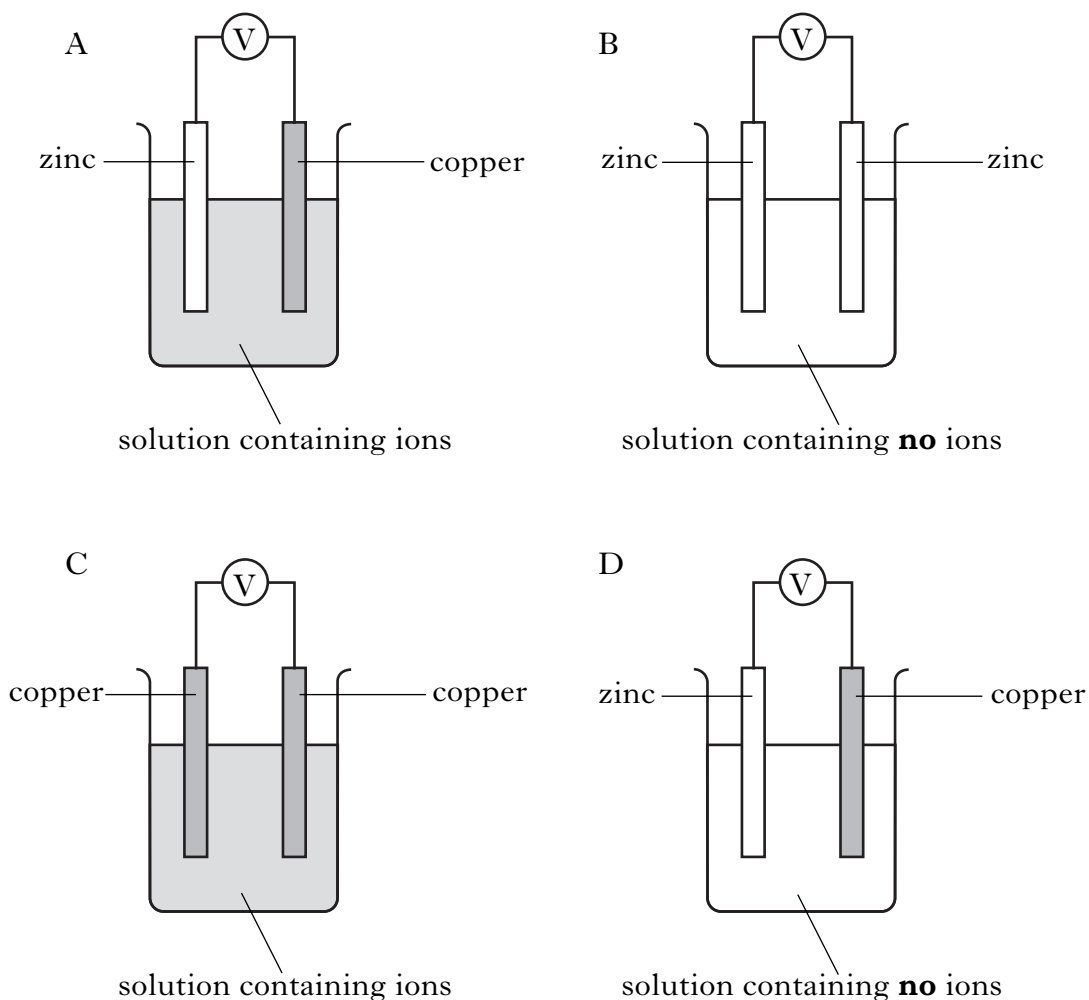
Which two experiments show how changing the particle size affects the speed of the reaction?

- A 1 and 2
- B 2 and 3
- C 3 and 4
- D 4 and 1

6. A nettle sting is acidic.  
Which of the following substances can neutralise a nettle sting?
- A Baking soda
  - B Lemon juice
  - C Soda water
  - D Vinegar
7. Which of the following is formed when dilute nitric acid is added to potassium hydroxide solution?
- A Water
  - B Oxygen
  - C Hydrogen
  - D Carbon dioxide
8. Which of the following metals is extracted from its ore using electricity?
- A Iron
  - B Silver
  - C Copper
  - D Aluminium
9. Which gas burns with a “pop”?
- A Carbon dioxide
  - B Hydrogen
  - C Nitrogen
  - D Oxygen
10. The corrosion of iron is also called
- A neutralisation
  - B galvanising
  - C combustion
  - D rusting.

**[Turn over**

11. Which of the following would produce electricity?



12. What substance is formed when soap is shaken with hard water?

- A Detergent
- B Grease
- C Scum
- D Shampoo

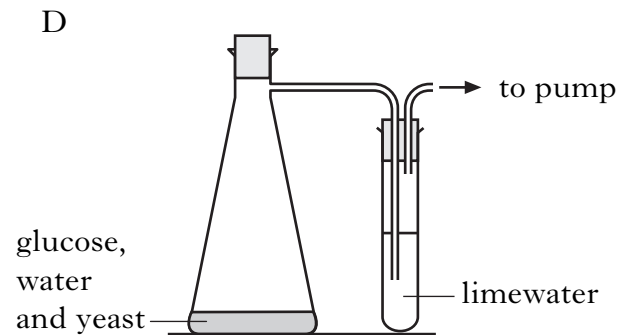
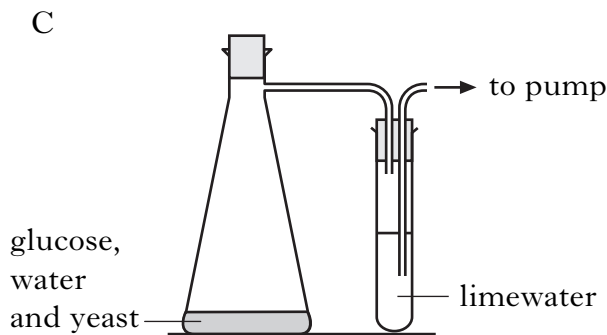
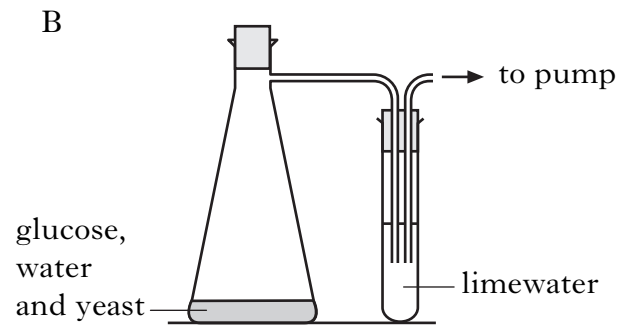
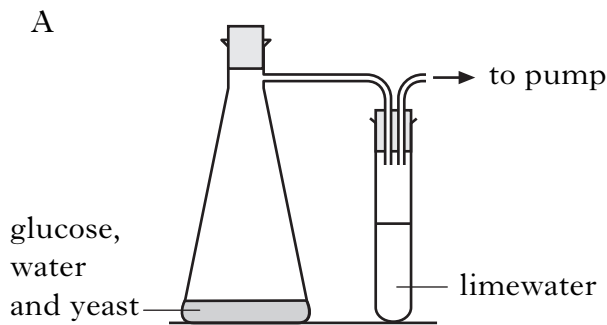
13. Which term describes the industrial method of producing shorter, more useful hydrocarbons from larger ones?

- A Cracking
- B Distillation
- C Evaporation
- D Filtration

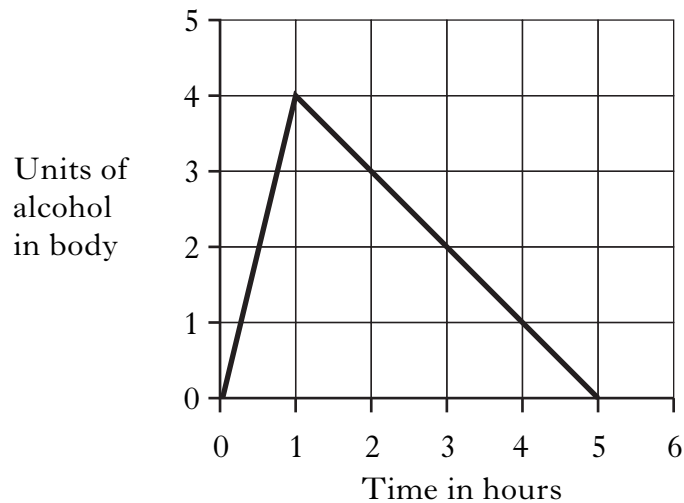
14. Which property of PVC plastic makes it suitable for covering electrical wires?
- A It is synthetic
  - B It is washable
  - C It is an electrical insulator
  - D It is thermoplastic
15. A herbicide is used to
- A control plant pests
  - B kill weeds
  - C prevent plant disease
  - D replace essential elements in soil.
16. Which **three** elements are essential for healthy plant growth?
- A Calcium, nitrogen and potassium
  - B Calcium, phosphorus and potassium
  - C Nitrogen, phosphorus and calcium
  - D Nitrogen, phosphorus and potassium
17. Animals obtain energy by respiration.  
During respiration
- A carbon dioxide is used up
  - B glucose is used up
  - C oxygen is produced
  - D starch is produced.

**[Turn over**

18. Which of the following should be used to show that carbon dioxide is produced during fermentation?



19. The graph shows how the alcohol level in a man's body changes with time.



During the first hour, the man drank

- A 1 pint of beer
- B 2 glasses of wine
- C 2 bottles of alcopop
- D 3 measures of spirit.



20. The table shows the number of drug-related deaths in Scotland over a five-year period.

Year	Number of drug-related deaths
1	153
2	209
3	247
4	251
5	267

Over the five-year period, the table shows that

- A the number of drug-related deaths increases
- B the number of drug-related deaths decreases
- C the number of drug-related deaths stays constant
- D there is no general trend in the number of drug-related deaths.

**Candidates are reminded that the answer sheet MUST be returned  
INSIDE this answer book.**

**[Turn over for Section B on *Page ten***

**SECTION B****40 marks are available in this section of the paper.****All answers must be written clearly and legibly in ink.****1.** Elements are listed in the Periodic Table.*(a)* Each element has a name and a chemical symbol.

Write the chemical symbol for the element magnesium.

(You may wish to use page 1 of the data booklet to help you.)

\_\_\_\_\_

**1***(b)* Each element has an atomic number.Name the element which has an atomic number of **6**.

(You may wish to use page 1 of the data booklet to help you.)

\_\_\_\_\_

**1***(c)* Each element is made up of atoms.

Atoms contain particles called protons and neutrons.

Use the following information to complete the table for the element sodium.

**Number of protons = atomic number****Number of protons + neutrons = mass number**

Atomic number	11
Number of protons	
Number of neutrons	12
Mass number	

**2****(4)**

Marks

2. Water from reservoirs needs to be treated before it can be used in the home. The table shows the reason for each treatment.

Treatment	Reason
clarification	to remove suspended solids
filtration	to remove undissolved solids
disinfection	to kill bacteria

- (a) During clarification, sodium aluminate is added to the water. Sodium aluminate contains aluminium and **two** other elements. Name the two other elements.

\_\_\_\_\_

\_\_\_\_\_

1

- (b) Filtration is used by water companies to remove solids. The filters used can be made from poly(propene). Name the monomer used to make poly(propene).

\_\_\_\_\_

1

- (c) Name the element which can be used as a disinfectant to kill bacteria.

\_\_\_\_\_

1

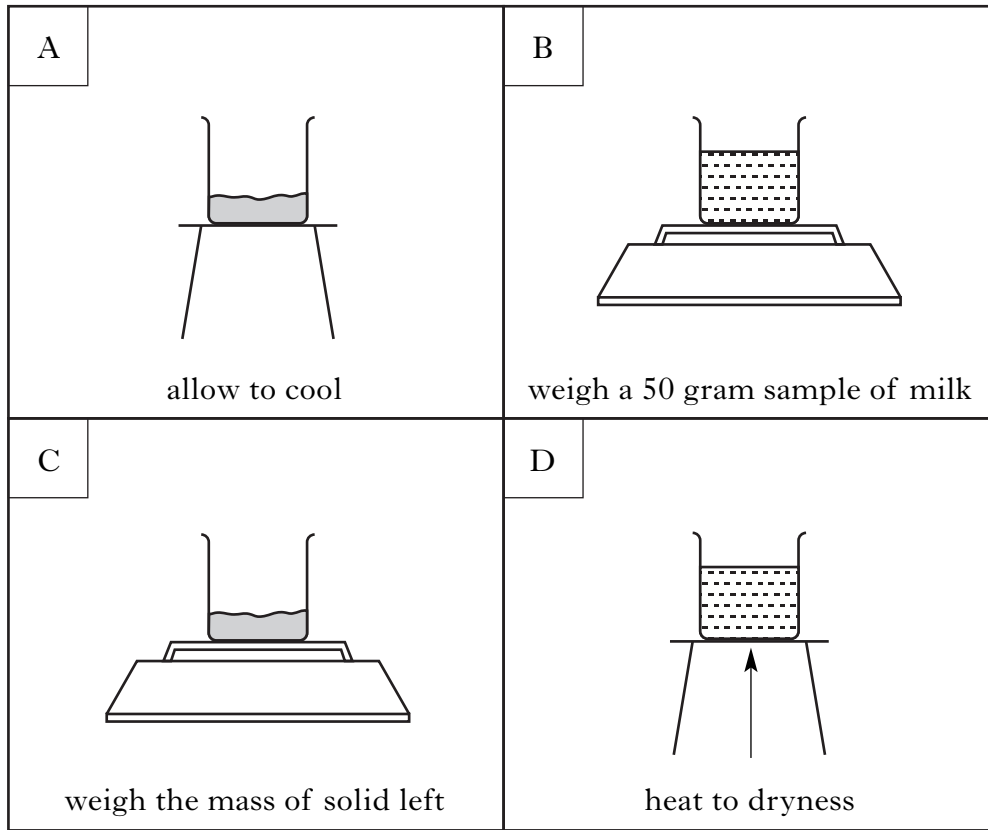
**(3)****[Turn over**

Marks

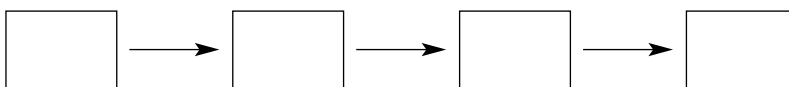
3. Milk is made up of mainly protein, fat, sugar and water.

A method which is used to find the mass of solids present in milk is shown.

50 grams of milk is weighed out. The milk is heated to dryness and then left to cool. The mass of solid remaining can then be measured.



(a) Place a letter in each box to show the order in which the experiment is carried out.



1

Marks

3. (continued)

(b) Benedict's solution can be used to test for sugars in milk.

The PPA "Testing for Starch and Sugars in Food" gives a method for this test.

<u>Method</u>	
<b>Step 1</b>	Pour some milk into a test tube.
<b>Step 2</b>	Add Benedict's solution to the test tube containing the milk.
<b>Step 3</b>	_____

(i) Complete step 3.

1

(ii) When Benedict's solution is added to milk a colour change takes place. What colour change would be seen?

Blue → \_\_\_\_\_

1

(3)

[Turn over

Marks

4. An alloy of aluminium is used in the manufacture of the European Airbus.



The table shows the elements present in the alloy.

Elements present in the alloy				
aluminium	copper	magnesium	silicon	iron

- (a) Name the element present in the alloy which is **not** a metal.

(You may wish to use page 1 of the data booklet to help you.)

\_\_\_\_\_

1

- (b) What property of aluminium makes it suitable to be used in the manufacture of aircraft bodies?

(You may wish to use page 5 of the data booklet to help you.)

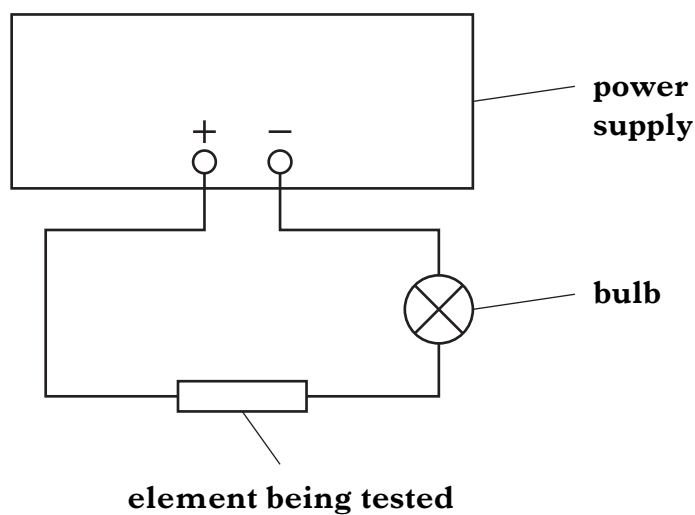
\_\_\_\_\_

1

Marks

## 4. (continued)

- (c) A student sets up the circuit below to test the electrical conductivity of aluminium and other elements.



- (i) What would be **seen** if the element conducts electricity?

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1

- (ii) Complete the table for the other elements.

Element	Conductor/Non-conductor
aluminium	conductor
sulphur	
tin	

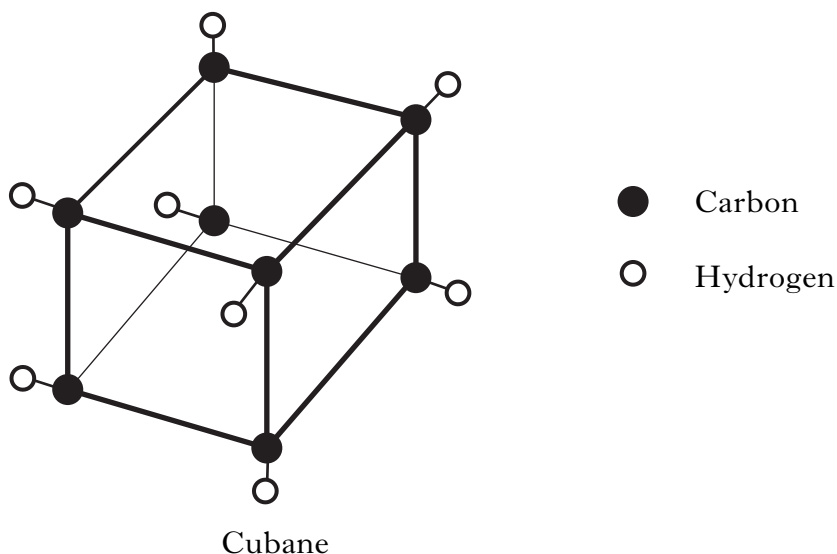
(You may wish to use page 1 of the data booklet to help you.)

1  
(4)

[Turn over

Marks

5. Cubane is a compound of carbon and hydrogen that can be used as an explosive.



- (a) What term is used to describe compounds which contain carbon and hydrogen only?

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1

- (b) The table shows the melting point of cubane and other carbon compounds.

Name of Compound	Molecular Formula	Melting point (°C)
Cubane		130
Octane	$C_8H_{18}$	-57
Cyclooctane	$C_8H_{16}$	14
Octene	$C_8H_{16}$	-102

- (i) Complete the table by adding the molecular formula of cubane.
- (ii) What is unusual about the melting point of cubane, when it is compared to the other melting points in the table?

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1

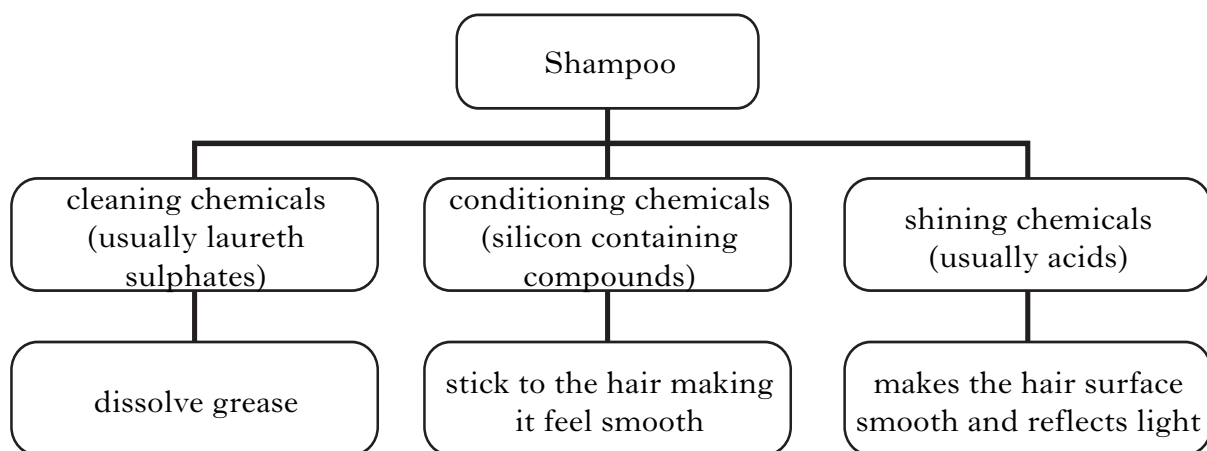
(3)



Marks

6. Shampoos contain different types of chemicals.

The three main types of chemicals, and their uses, are shown in the chart.



Use the information in the chart to answer the following questions.

(a) Why do **cleaning** chemicals in shampoo remove grease from hair?

\_\_\_\_\_ 1

(b) Shampoos contain chemicals to make the hair shine.

Suggest a pH value for these chemicals.

\_\_\_\_\_ 1

(c) The label shows the ingredients in a shampoo.



Identify an ingredient which could be a **cleaning** chemical.

\_\_\_\_\_ 1  
(3)

Marks

7. Coal is used as a fuel.



- (a) When coal burns energy is released.  
Name the gas needed for coal to burn.

---

1

- (b) Coal contains mainly carbon.  
The table shows the percentage of carbon in different types of coal.

Type of coal	Percentage of carbon
lignite	50
bituminous	65
anthracite	90

- (i) When it is burned, anthracite produces more energy than the other two types of coal.  
Suggest a reason for this.

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1

Marks

**7. (b) (continued)**

- (ii) Calculate the mass of carbon present in 200 kilograms of anthracite.

**Show your working clearly.**

\_\_\_\_\_ kilograms.

**1**

- (c) Coal is a finite resource.

What is meant by a finite resource?

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**1**

**(4)**

**[Turn over**

Marks

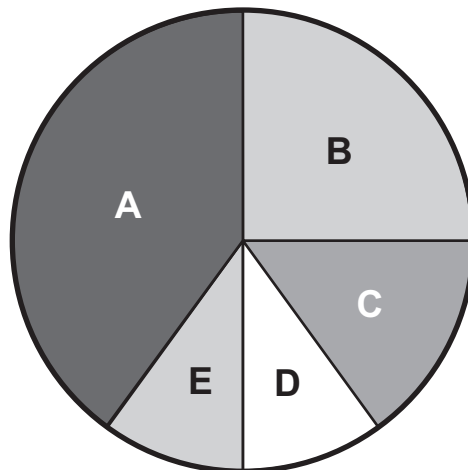
8. The table shows the percentage of each type of waste in an average household.

Type of waste	Percentage of household waste
paper and card	25
waste plant material	15
plastic	10
glass	
other	40

- (a) Complete the table to show the percentage of waste from glass.

1

- (b) The pie chart shows the information from the table.



- (i) Which letter shows waste due to paper and card?

Letter \_\_\_\_\_

1

- (ii) Identify the type of waste shown as C in the pie chart.

\_\_\_\_\_

1

**8. (continued)**

*Marks*

(c) Household waste can be disposed of in a variety of ways.

(i) Name one type of waste which can be recycled.

\_\_\_\_\_

**1**

(ii) Waste plant material can decompose to produce a gas. This gas is used as a renewable energy source.

Name this gas.

\_\_\_\_\_

**1**

**(5)**

**[Turn over**

9. Read the following passage and answer the questions.

Marks

All additives used in foodstuffs must be safe. Many foods go off quickly without the use of preservatives. It is now known that preservatives prevent the growth of micro-organisms, some of which are extremely dangerous.

Most preservatives are simple chemicals and are closely related to natural substances. For example, benzoic acid occurs in several fruits and is widely used in fruit preservation. Sorbic acid, another preservative, is an unsaturated acid found in some plants.

Some preservatives have been used for hundreds of years. For example wood smoke is used to preserve fish. However, wood smoke contains a large number of hydrocarbons, some of which cause cancer.

Adapted from *In the Mix* by Food Additives and Ingredients Association.

(a) Why are preservatives added to food?

---

---

1

(b) Name the unsaturated acid found in some plants.

---

1

(c) Which compounds present in wood smoke may cause cancer?

---

1

(d) Sulphur dioxide is another widely used preservative.

Write the formula for sulphur dioxide.

---

1

(4)

10. The table shows the nutritional information of a burger.

Marks

Class of food	Protein	Carbohydrate	Fat	Fibre
Mass in grams per 100 grams	15.0	18.2	13.0	1.8

(a) (i) Why are carbohydrate and fat needed by the body?

\_\_\_\_\_

1

(ii) In 100 grams of a burger there are 13 grams of fat.

Why are people encouraged to eat less fat?

\_\_\_\_\_

\_\_\_\_\_

1

(b) (i) Why must fibre be included in the diet?

\_\_\_\_\_

\_\_\_\_\_

1

(ii) A burger was found to contain 30 grams of protein.

What is the mass of fibre in a 200 gram burger?

\_\_\_\_\_ grams

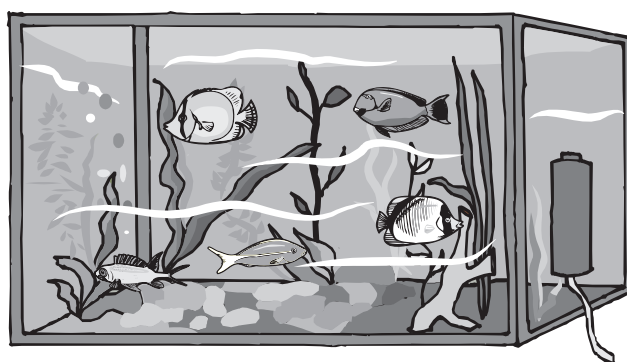
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(4)

[Turn over

Marks

11. Plants such as elodea are placed in fish tanks to supply oxygen. They produce oxygen by photosynthesis.



- (a) What type of energy is needed for photosynthesis to take place?

\_\_\_\_\_

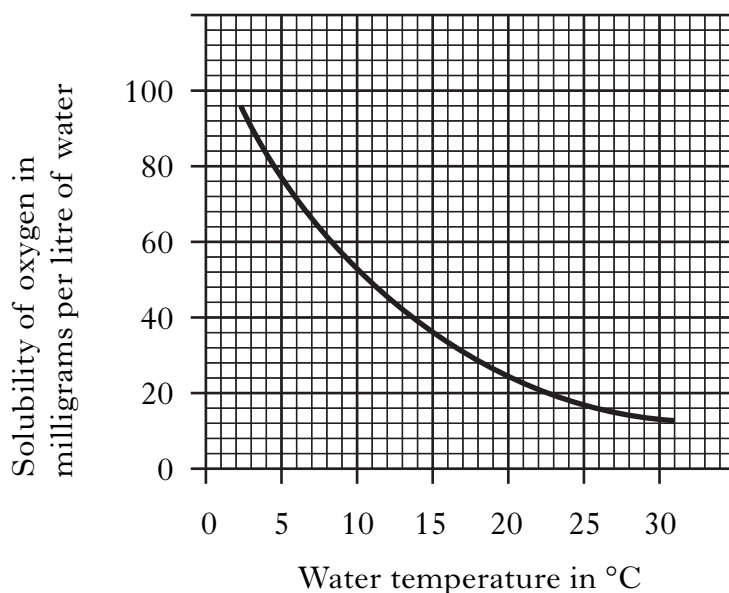
1

- (b) Complete the word equation for photosynthesis.

\_\_\_\_\_ + water  $\longrightarrow$  glucose + oxygen

1

- (c) The graph shows how the solubility of oxygen in water changes with temperature.



Use the graph to complete the following sentence.

As the temperature of the water increases, the solubility of oxygen

\_\_\_\_\_.

1

(3)

[END OF QUESTION PAPER]



**ADDITIONAL SPACE FOR ANSWERS**

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**ADDITIONAL SPACE FOR ANSWERS**

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## ACKNOWLEDGEMENTS

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Section B Question 9—Extract—adapted from *In the Mix*. Reproduced by kind permission of FAIA.