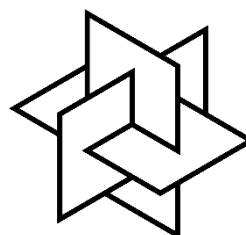


First name	
Last name	
School	

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**CE AT 13+**

**SCIENCE**



**ISEB**  
Independent Schools  
Examinations Board

**CORE CHEMISTRY**

**Specimen Paper**

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Date

Time allowed: 40 minutes

**Instructions**

Answer **all** the questions.

**Information**

You may use a calculator.

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1. Underline the word or phrase which best completes the following:

(a) A gas which goes 'pop' when lit could be

**carbon dioxide**

**helium**

**hydrogen**

**nitrogen**

(b) The substance which is an alkali is

**lemon juice**

**limewater**

**salty water**

**vinegar**

(c)



The volume of liquid in the measuring cylinder above is

**7.4 cm<sup>3</sup>**

**7.6 cm<sup>3</sup>**

**8.4 cm<sup>3</sup>**

**76 cm<sup>3</sup>**

(d) An element which forms an oxide which is neutral is

**calcium**

**hydrogen**

**magnesium**

**sulfur**

(e) Sugar solution is

**a mixture of an element and a compound**

**a mixture of two compounds**

**a pure compound**

**an element**

(f) When a hydrocarbon is burnt completely in air, the products are

**carbon and hydrogen**

**carbon dioxide and hydrogen**

**carbon dioxide and water**

**carbon monoxide and water**

(g) When calcium carbonate is heated strongly, it decomposes into solid calcium oxide and carbon dioxide gas.

The mass of the carbon dioxide formed is

**less than the calcium carbonate**

**more than the calcium carbonate**

**the same as the calcium carbonate**

**zero**

[7]

2. Slate is used for roof tiles.



(a) State two properties of slate which make it useful for this job.

1: .....

2: ..... [2]

Copper is used for electrical wiring.



(b) (i) State two properties of copper which make it useful for this job.

1: .....

2: ..... [2]

(ii) Explain why the copper wire in the picture is wrapped in plastic.

..... [1]

3. Billy wanted to find out how much salt there was in a packet of crisps.



First, he opened the packet and added some water before shaking it.

- (a) What would happen to the salt in the packet?

..... [1]

Next he filtered the contents of the bag.

- (b) Draw and label the apparatus he could use to do this.

[2]

- (c) Describe what he should do next to find out how much salt there was.

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

Billy read that crisp packets are filled with nitrogen gas to help keep the crisps fresh.

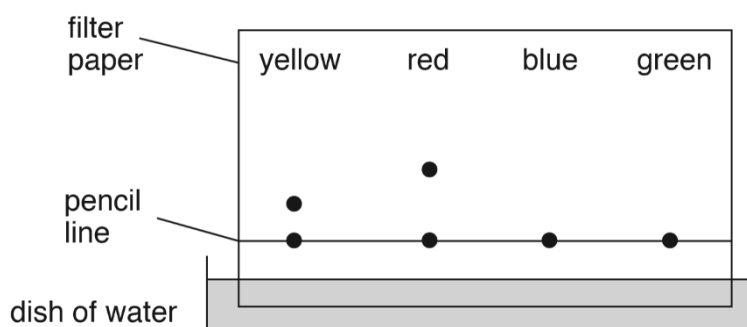
- (d) Suggest why filling the bag with nitrogen keeps the crisps fresher than filling the bag with air.

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

4. Bobbie wanted to investigate the colours in her set of felt-tip pens.

First she put a spot of each colour near the bottom of a piece of filter paper, then stood the paper in a dish of water.

The colours moved up the paper and the results for only red and yellow are shown on the diagram below.



- (a) (i) Name the process which Bobbie used.

..... [1]

- (ii) Suggest why she used filter paper rather than writing paper.

..... [2]

The blue dye travelled twice as far as the red dye.

The green dye is made of the yellow and blue dyes mixed together.

- (b) On the diagram above,

- (i) accurately mark a point where the blue dye spot reached [1]

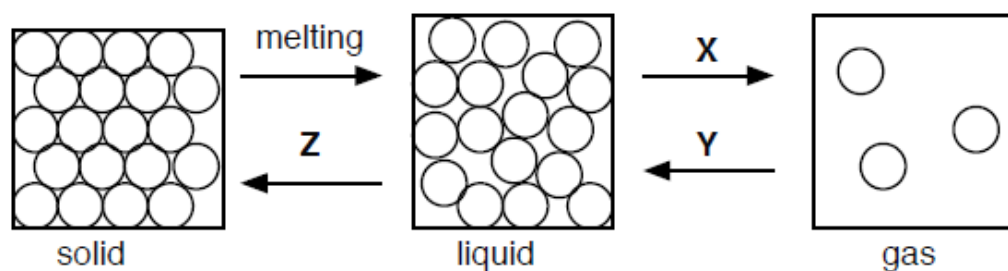
- (ii) draw the result for the green felt-tip [1]

Her friend repeated the experiment but used propanone instead of water in the dish.

- (c) Discuss any differences you might expect between their results.

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

5. The diagram below shows how the particles are arranged in the three states of matter.



- (a) Name the changes of state labelled **X**, **Y** and **Z** in the diagram above.

**X:** .....

**Y:** .....

**Z:** ..... [3]

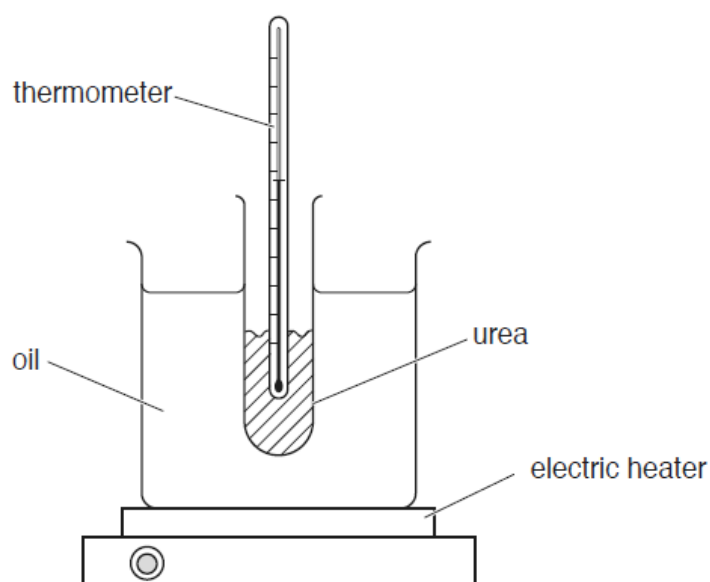
Urea is a white solid.

The melting point of urea can be measured using the apparatus below.

The urea is placed in a test tube with a thermometer.

The test tube is then put into oil in a beaker.

The liquid is heated and the temperature at which the urea melts is recorded.



Urea has a melting point of 133 °C.

(b) (i) Explain why oil is used rather than water in this experiment.

..... [1]

(ii) Suggest a reason why an electric heater is used instead of a Bunsen burner.

..... [1]

Two samples of a white solid, **A** and **B**, are thought to be urea.

The melting temperature of each solid is measured in the apparatus shown opposite and the results are given in the table below.

	melting temperature, in °C
solid <b>A</b>	133
solid <b>B</b>	128 - 131

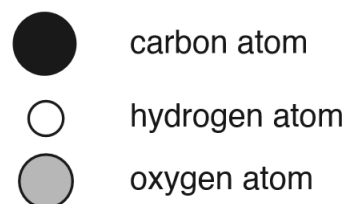
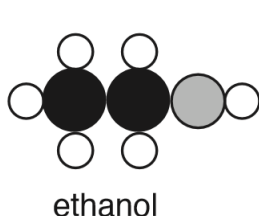
(c) Explain what these results tell you about solids **A** and **B**.

.....

.....

..... [2]

6. The diagram shows a molecule of the compound ethanol.



(a) (i) Explain what is meant by the term molecule.

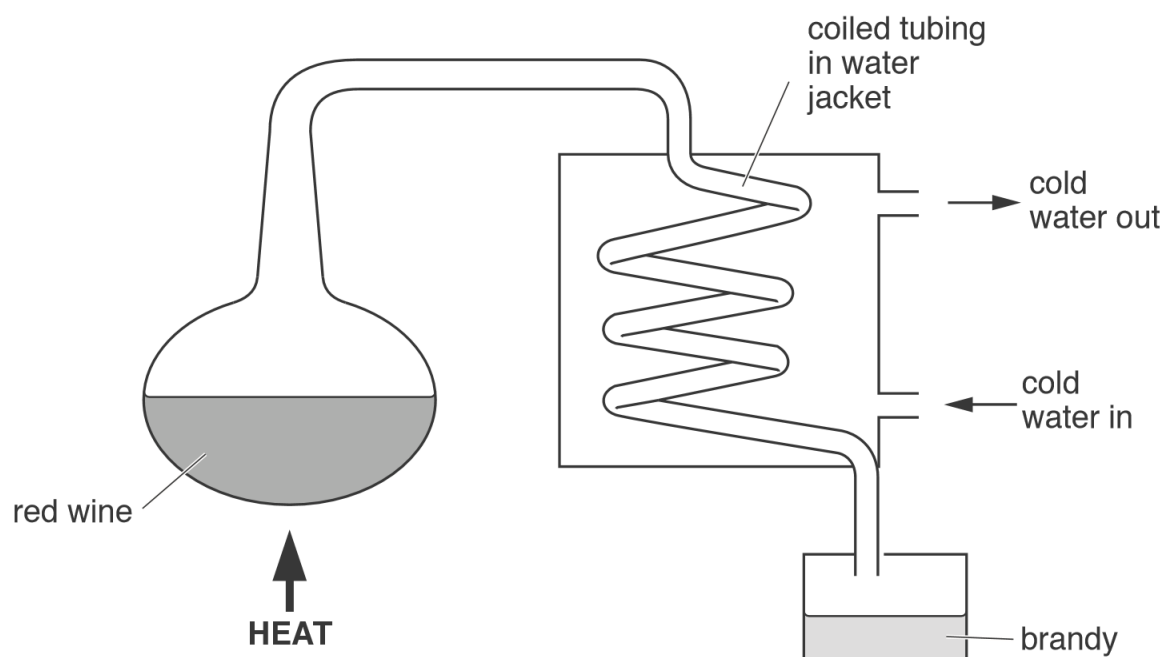
..... [1]

(ii) Write down the chemical formula of ethanol: ..... [2]

Wine and brandy are both mixtures containing ethanol and water, as well as many other compounds.

	boiling point, in °C
ethanol	78
water	100

Brandy can be made from red wine by using the process below.





The red wine is heated and the resulting vapour passes out of the top and through the apparatus shown.

The brandy is collected in the container

(b) (i) State the name of this separation process.

..... [1]

(ii) State what happens to the vapour in the coiled tubing.

..... [1]

(iii) Explain why there is a higher percentage of ethanol in brandy than in wine.

..... [2]

The pH values of the four liquids are shown below.

	water	ethanol	red wine	brandy
pH value	7.0	7.0	3.2	4.3

(c) Give two reasons why an electrical pH meter would be better than Universal Indicator to make these measurements.

1: .....

2: ..... [2]

(d) State which of the four liquids is the strongest acid

..... [1]

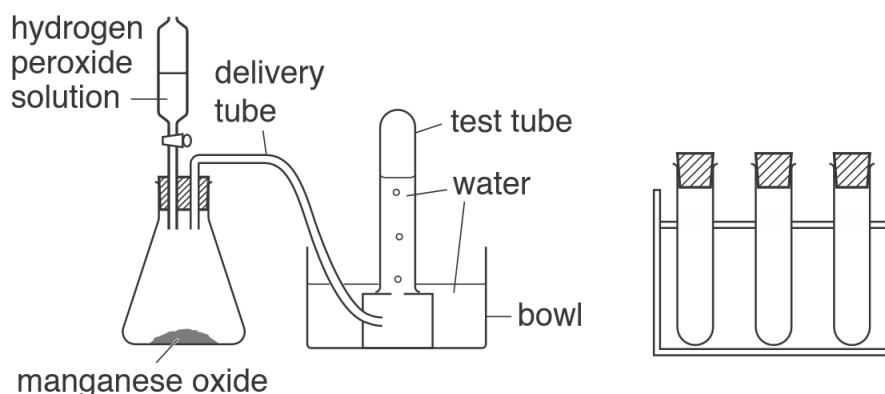
(e) (i) Name a compound which could be added to brandy to raise its pH value to 7.0

..... [1]

(ii) Name this type of reaction.

..... [1]

7. The apparatus below was used to make and collect oxygen gas. As each test tube filled up, it was stoppered and kept for testing.



When the solution of hydrogen peroxide came into contact with the manganese oxide, it decomposed to form oxygen and water.

The manganese oxide remained unchanged

- (a) Write a word equation for this reaction.

..... [1]

- (b) Describe a test which would prove that the gas was oxygen.

test: .....

result: ..... [2]

- (c) (i) Explain how the apparatus could be modified to measure the volume of oxygen formed.

..... [1]

It was found that 6 cm<sup>3</sup> of hydrogen peroxide produced 150 cm<sup>3</sup> of oxygen.

- (ii) Work out the volume of hydrogen peroxide which would be needed to produce 100 cm<sup>3</sup> of oxygen.

(Show your working.)

.....

..... [2]

(iii) Explain, in terms of particles, why such a small volume of hydrogen peroxide can produce such a large volume of oxygen gas.

.....

..... [2]

(d) Describe carefully what you would do to prove that none of the manganese oxide had been used up during the experiment.

State what you would do and what measurements you would make.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

8. Alice pours some perfume into a shallow dish and leaves it in the middle of a room.



After a few minutes, she notices that there is no liquid left in the shallow dish.

- (a) State what has happened to the perfume

..... [1]

Alice also notices that the perfume can be smelled all around the room.

- (b) Name and describe, in terms of particles, the process which allows Alice to smell the perfume around the room.

name: ..... [1]

description: .....

..... [2]

(Total marks: 60)