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United Curriculum
End-of-Year Assessment 2023-24

Science - Chemistry

Time: 40 minutes

Year 7

Paper 1

Student surname:

Student first name(s):

Class name / number:

You must have: A ruler and a calculator.

Instructions
- Fill in the boxes on the front page.
- Use a black ink pen.
- The marks for each question are shown.
- Answer the questions in the space provided.
- Cross through any work you do not want to be marked.

Advice
- Read each question carefully before you begin.
- Try your best to answer every question. If you have time, go back and review your answers.

For Teacher use only:

Question 1		4	Question 4		8	TOTAL MARKS	
Question 2		4	Question 5		10		40
Question 3		6	Question 6		8		

Question 1 (4 marks)

Changes of State

1a. What is the name given to the following change of state: **solid to liquid**?
Tick **one** box.

Name	Tick (✓)
Evaporation	
Freezing	
Melting	
Sublimation	

	1

1b. Which of the below can **flow**?
Tick **one** box.

State of matter	Tick (✓)
Solid **and** liquid	
Liquid **and** gas	
Gas only	
Liquid only	

	1

1c. Which of the below can be **compressed**?
Tick **one** box.

State of matter	Tick (✓)
Solid **and** liquid	
Liquid **and** gas	
Gas only	
Liquid only	

	1

1d. Ethanol has a melting point of -114 °C.

It has a boiling point of 78 °C.

What state of matter will ethanol be at a temperature of **0 °C**?

Tick **one** box.

State of matter	Tick (✓)
Solid	
Liquid	
Gas	
Plasma	

	1

Turn over for the next question

Question 2 (4 marks)

Metals and Acid

Below is a word equation for a chemical reaction:

zinc + sulfuric acid → zinc sulfate + hydrogen

2a. Give the name of one of the **reactants** in this reaction.

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1

2b. Give the name of one of the **products** in this reaction.

.....

1

2c. The sulfuric acid has a pH of 2.

What happens to the pH as the zinc reacts with the acid?

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1

2d. When the sulfuric acid reacts with zinc it forms zinc sulfate solution.

More zinc is added until **all** of the sulfuric acid has reacted.

No more acid is added.

What will be the pH of the zinc sulfate solution when **all** of the acid has reacted?

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.....

1

Turn over for the next question

Question 3 (6 marks)

Chromatography

A student used chromatography to identify the coloured substances in the brown ink from a felt-tip pen.

She compared it to red, blue, green and yellow coloured ink.

She used water as the solvent.

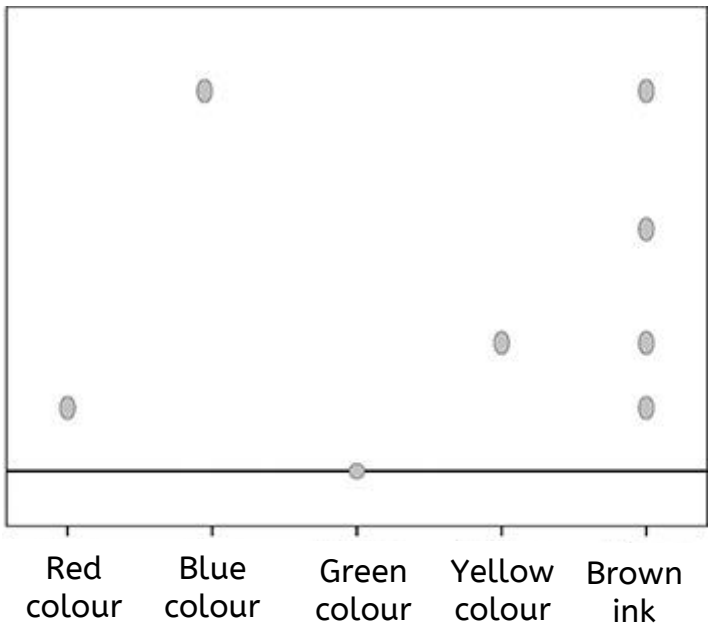

Figure A: A chromatography test.

3a. Using **Figure A,** which colours tested were present in the brown ink?

.....

.....

1

3b. Using **Figure A,** which colour tested was not present in the brown ink?

.....

.....

1

3c. What other conclusion about the brown ink can you make from the diagram?

.....

.....

	1

3d. Why was the green colour still on the start line at the end of the experiment?
Tick **one** box.

Reason	Tick (✓)
The experiment was left for too long.	
The green colour was insoluble in the solvent.	
The green spot contained too many colours.	
The green spot was too small.	

	1

3e. Why should she use a **pencil** to draw the line?

.....

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	1

The student used water as the solvent in this experiment.

She repeated the experiment with a different set of pens and it did **not** work.

She then used ethanol instead of water.

3f. Suggest why the experiment worked with ethanol but **not** with water.

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	1

Turn over for the next question

Question 4 (8 marks)

Distillation

A teacher used the apparatus below to distil 100 cm^3 of an ink and water solution.

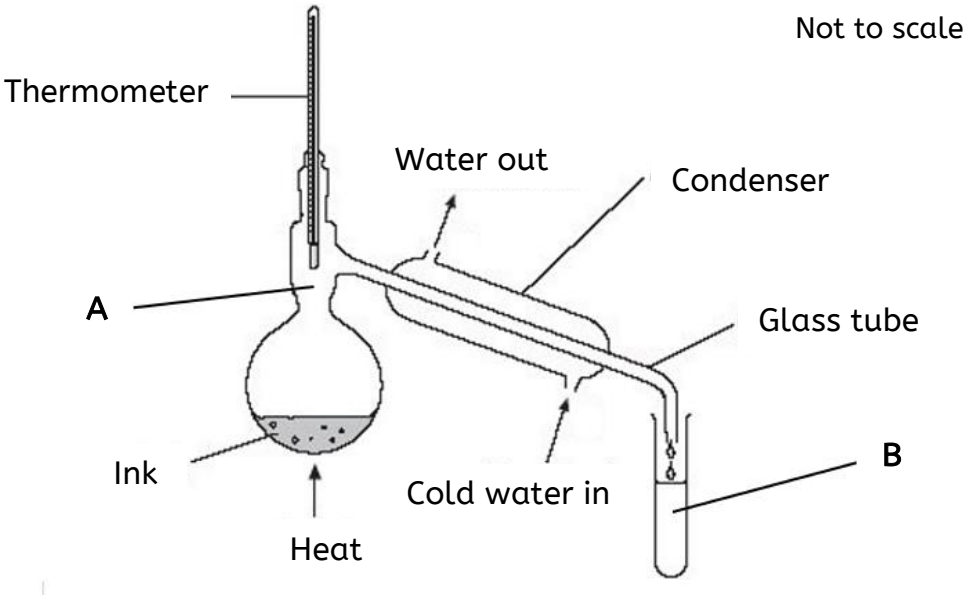

Figure B: A diagram of a distillation apparatus.

4a. Use **Figure B** to give the name of the colourless liquid that collects in the test-tube.

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	1

4b. In the box below, draw **eight** circles, ◯, to show the arrangement of particles at **B**.

	1

4c. Use **Figure B** to describe how the movement of particles changes between point **A** and **B**.

.....

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1

4d. Use **Figure B** to give one way the movement of particles does **not** change between **A** and **B**.

.....

.....

1

4e. Which changes of state occur during distillation?
Tick **one** box.

Changes of state	Tick (✓)
Condensation then evaporation	
Boiling then condensation	
Melting then boiling	
Melting then evaporation	

1

4f. The ink and water solution has been boiling for two minutes.

The temperature reading on the thermometer is 100 °C.

What does this tell you about the boiling point of ink?

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1

4g. The same apparatus was used again to separate a mixture of three liquids, **X**, **Y** and **Z**.

The table below shows the boiling points of the three liquids in the mixture:

Liquid	Boiling point
X	118
Y	78
Z	138

Which liquid, **X**, **Y** or **Z**, will collect in the test-tube first?

Explain your answer.

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2

Turn over for the next question

Question 5 (10 marks)

Soil pH

A gardener measured the pH of different soils.

5a. Tick **one** box in each row to show if each soil is acidic, neutral or alkaline.

Soil	pH of soil	Acidic	Neutral	Alkaline
A	4.5			
B	5.5			
C	6.3			
D	7.0			
E	7.8			

2

5b. A hydrangea is a flowering plant.

Hydrangea flower

The gardener notices that the colour of hydrangea flowers is different for plants grown in different places.

He records the colour of the flowers on each plant.

His results are shown in the table below.

Soil	pH of soil	Colour of flowers			
		Blue	Violet	Light pink	Dark pink
A	4.5	✓			
B	5.5		✓		
C	6.3		✓		
D	7.0			✓	
E	7.8				✓

Do the results on the opposite page support the conclusion that the colour of hydrangea flowers depends on pH?

Tick **one** box

Yes ☐ **No** ☐

Explain your answer.

.....

.....

1

5c. The gardener wanted to change the pH of **soil E** from 7.8 to 3.0.

He decided to add something to the soil to change the pH.

He had four substances to choose from:

Substance	**pH**
Ferrous salts	2.5
Gypsum	6.7
Salt water	7.0
Hydrated lime	12.4

Which of the following substances should he add?

Explain your answer.

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2

5d. The gardener tested the soil pH using universal indicator.

What colour will the indicator be when the soil pH is 3.0?

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1

5e. The gardener wanted to change the pH of soil C from 6.3 to 7.0.

This is an example of a neutralisation reaction.

Describe what is meant by the term 'neutralisation'.

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2

5f. Complete the general word equation for the reaction between an acid and an alkali:

Acid + alkali → ..... + ...

2

Turn over for the next question

Question 6 (8 marks)

Freezing investigation

A student investigated the effect of dissolving different masses of salt in water on how fast it freezes.

The student measured 80 cm^3 of water into 5 different beakers, adding different masses of salt to each beaker.

The beakers were placed in a freezer.

Her independent variable was the mass of salt dissolved in the water.

Her dependent variable was the time taken to freeze.

6a. The student also kept several variables the same.

What do we call the variables we keep the same in an investigation?

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1

6b. She used the same size beaker for each measurement.

Suggest **two** other things she should have kept the same.

.....

.....

2

6c. In one beaker she had 123 g of salt solution.

This solution was made with 81 g of pure water.

What mass of salt did she add to the water make the salt solution?

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Mass of salt = ... g

	2

6d. Describe the change of state that happens during freezing.

Include in your answer a description of what happens to the arrangement **and** movement of particles during freezing.

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	3

END OF ASSESSMENT

This is the end of the assessment.
There are no questions printed on this page.