OCR GCSE GATEWAY CHEMISTRY A · J248

CHEMISTRY



EXAM QUESTION PACK

WS1.1 DEVELOPMENT OF SCIENTIFIC THINKING

SCORE	PERCENTAGE
/20	%

STEMUP

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Gateway Chemistry A (9-1)

Development in scientific thinking

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **20**.
- The total number of marks may take into account some 'either/or' question choices.

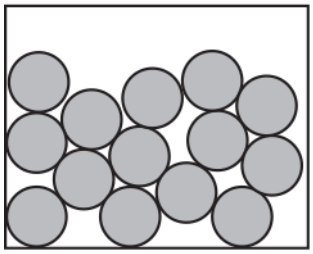
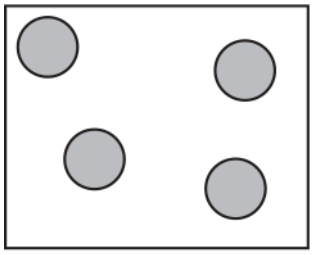
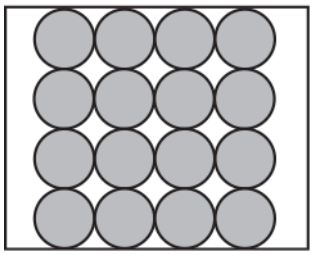
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1 The particle model shows how particles are arranged and how they move in the three states of matter.

(i) Draw a line to match each **diagram** with the correct **state of matter**.

Diagram	State of matter
	Solid
	Liquid
	Gas

[2]

(ii) When a liquid is heated to its boiling point, it will turn into a gas.

Use the particle model to explain why this is a **physical change**.

---

[1]

2(a) Dmitri Mendeleev produced a Periodic Table of elements which is the basis for our modern Periodic Table. He left gaps for elements that had not been discovered yet as shown in **Fig. 23.1**.

I	II	III	IV	V	VI	VII
H						
Li	Be	B	C	N	O	F
Na	Mg	Al	Si	P	S	Cl
K	Ca		Ti	V	Cr	Mn
Cu	Zn			As	Se	Br
Rb	Sr	Y	Zr	Nb	Mo	
Ag	Cd	In	Sn	Sb	Te	I
Ce	Ba	La		Ta	W	
Au	Hg	Tl	Pb	Bi		

Fig. 23.1

Describe **two** ways Mendeleev arranged the elements in his Periodic Table.

1 ---

---

2 ---

---

[2]

(b) Mendeleev left gaps in his Periodic Table for undiscovered elements. He predicted properties of these elements.

Table 23.1 shows the predicted properties for one of these elements in one of the gaps.

Mendeleev called this element 'eka-silicon'.

Appearance	Grey metal
Melting point (°C)	Over 800
Relative atomic mass	72
Density (g / cm^3)	5.5

Table 23.1

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Table 23.2 shows some of the elements that were discovered after Mendeleev published his Periodic Table.

	Scandium (Sc)	Gallium (Ga)	Germanium (Ge)	Technetium (Tc)
Appearance	Silver-white metal	Silver-blue metal	Grey-white metal	Grey metal
Melting point (°C)	1541	30	947	2157
Relative atomic mass	45.0	69.7	72.6	98.0
Density (g / cm^3)	3.0	5.9	5.35	11.0

Table 23.2

(i) Which element matches Mendeleev's predictions for 'eka-silicon'?

Tick (✓) **one** box.

Scandium ☐

Gallium ☐

Germanium ☐

Technetium ☐

[1]

(ii) Give **two** reasons for your answer to **(c)(i)**.

1 ----------

---

2 ----------

---

[2]

3 Which Period 3 element is in Group 2?

A Aluminium
B Boron
C Calcium
D Magnesium

Your answer [ ] [1]

4(a) Dmitri Mendeleev produced a Periodic Table of elements which is the basis for our modern Periodic Table. He left gaps for elements that had not been discovered yet as shown in **Fig. 17.1**.

I	II	III	IV	V	VI	VII
H						
Li	Be	B	C	N	O	F
Na	Mg	Al	Si	P	S	Cl
K	Ca		Ti	V	Cr	Mn
Cu	Zn			As	Se	Br
Rb	Sr	Y	Zr	Nb	Mo	
Ag	Cd	In	Sn	Sb	Te	I
Ce	Ba	La		Ta	W	
Au	Hg	Ti	Pb	Bi		

Fig. 17.1

Describe **two** ways Mendeleev arranged the elements in his Periodic Table.

1 _____

_____

2 _____

_____

[2]

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(b) Mendeleev left gaps in his Periodic Table for undiscovered elements. He predicted properties of these elements.

Table 17.1 shows the predicted properties for one of these elements in one of the gaps.

Mendeleev called this element 'eka-silicon'.

Appearance	Grey metal
Melting point (°C)	Over 800
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Table 17.2

(i) Which element matches Mendeleev's predictions for 'eka-silicon'?

Tick (✓) **one** box.

Scandium ☐

Gallium ☐

Germanium ☐

Technetium ☐

[1]

(ii) Give **two** reasons for your answer to **(i)**.

1 _____

2 _____

_____

[2]

5 A farmer wants to test the pH of soil samples. He researches information about different pH test kits.



Look at the information he finds.

pH test kit	Price	pH of soil sample				
		pH 2	pH 4	pH 7	pH 9	pH 14
A	£4.95	Red	Yellow	Green	Blue	Purple
B	£10.99	Yellow	Yellow	Pink	Pink	Pink
C	£11.50	Pink	Orange	Yellow	Blue	Blue
D	£2.99	Colourless	Colourless	Colourless	Pink	Pink
E	£12.75	Red	Orange	Yellow	Yellow	Yellow

* Evaluate the advantages and disadvantages of the pH test kits and suggest which pH test kit the farmer should use.

_____

_____

_____

_____

_____

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[6]

6 Many scientists believe an **enhanced greenhouse effect** is caused by human activities.

(i) State a **human activity** that can cause an enhanced greenhouse effect.

[1]

(ii) State **two** environmental effects of an enhanced greenhouse effect.

1

2

[2]

END OF QUESTION PAPER