

Past-paper walk-through

Group I properties ■ 8.2

eXercise

Questions in this set

- 0620/21 N25 Q24 ■ 1 mark
- 0620/22 N25 Q23 ■ 1 mark
- 0620/23 N25 Q27 ■ 1 mark
- 0620/22 J25 Q22 ■ 1 mark
- 0620/23 J25 Q21 ■ 1 mark
- 0620/42 J25 Q5 ■ 14 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 24

0620/21 N25 ■ Q24 ■ 1 mark

24 Which properties decrease down the group of alkali metals?

1 melting point

2 density

3 reactivity

A 1 and 2

B 1 only

C 2 and 3

D 3 only

Solution 24

Answer: **B**

Why

- Melting point *decreases* down Group I, as the metallic bonding weakens.
- Density generally increases down the group.
- Reactivity also increases down the group, so only the melting point decreases.

Question 23

0620/22 N25 ■ Q23 ■ 1 mark

- 23** Which statement about the elements in Group I is correct?
- A** Hydrogen is produced when Group I elements react with water.
 - B** Ions of Group I elements have a 1– charge.
 - C** Sodium is more reactive than potassium.
 - D** Solid sodium is a poor electrical conductor.

Solution 23

Answer: **A**

Why

- Group I metals react with water to give the metal hydroxide and hydrogen gas.
- Their ions carry a 1+ charge, since each atom loses one electron.
- Reactivity increases down the group, so potassium is more reactive than sodium.

Question 27

0620/23 N25 ■ Q27 ■ 1 mark

- 27** Which statement about Group I or Group VII elements is correct?
- A** Group VII elements are monatomic non-metals.
 - B** Lithium is more reactive with water than caesium.
 - C** The melting point of Group I metals increases down the group.
 - D** Potassium bromide reacts with chlorine to produce an orange solution.

Solution 27

Answer: **D**

Why

- Group VII elements exist as diatomic molecules, not single atoms.
- Reactivity increases down Group I, so caesium is far more reactive than lithium.
- Melting point *decreases* down Group I, while it increases down Group VII.

Question 22

0620/22 J25 ▪ Q22 ▪ 1 mark

22 Sodium is a Group I metal.

What is a physical property of sodium?

A non-conductor of electricity

- B** high melting point
- C** high density
- D** malleable

Solution 22

Answer: **D**

Why

- Sodium is a metal, so it conducts electricity and is malleable.
- But it is a *Group 1* metal: soft, with a low melting point and a low density.
- Malleability is the only listed property that a Group 1 metal actually has.

Question 21

0620/23 J25 ■ Q21 ■ 1 mark

21 A Group I metal (lithium or potassium) is reacted with a Group VII element (chlorine or iodine).

Which compound is formed when the Group I metal of highest density reacts with the Group VII element of lowest density?

- A** potassium chloride
- B** lithium chloride
- C** potassium iodide
- D** lithium iodide

Solution 21

Answer: **A**

Why

- Density increases *down* Group I, so potassium is denser than lithium.
- Density also increases down Group VII, so chlorine is less dense than iodine.
- Potassium with chlorine gives potassium chloride, KCl.

Question 5

0620/42 J25 ■ Q5 ■ 14 marks

5 Alkali metals are reactive elements.

(a) State the group number of the alkali metals.

Question 5

(b) Identify the alkali metal which:

(i) has the highest melting point

Question 5

(ii) has the highest density

Question 5

(iii) has the lowest reactivity

Question 5

(iv) burns with a lilac flame

Question 5

(v) is found in fertilisers to improve plant growth.

Question 5

(c) Sodium sulfide, Na_2S , is an ionic compound.

Complete Fig. 5.1 to show the electronic configurations of the ions in sodium sulfide.

Show the charges on the ions.

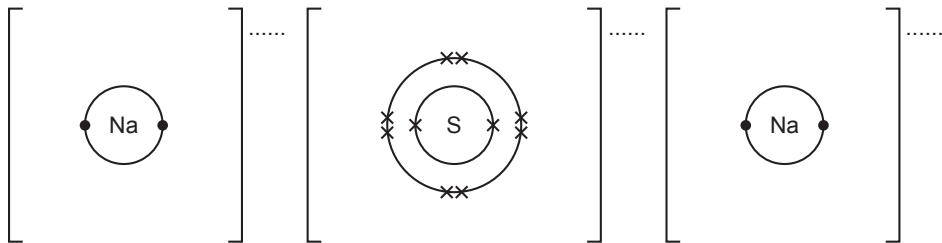


Fig. 5.1

[3]

- (d) Rubidium has only two naturally occurring atoms, ^{85}Rb and ^{87}Rb .
- (i) State the term given to these naturally occurring atoms of rubidium.

Question 5

- (ii) Complete Table 5.1 to show the number of protons, neutrons and electrons in the atom and ion of rubidium shown.

Table 5.1

	^{85}Rb	$^{87}\text{Rb}^+$
protons		
neutrons		
electrons		

[3]

Question 5

(iii) The relative atomic mass of rubidium to one decimal place is 85.5.

Determine the relative abundance of ^{85}Rb in rubidium. Express your answer as a percentage.

Question 5

[Total: 14]

Solution 5

(a)

Mark scheme

- 1
- 1

Solution 5

(b)(i)

Mark scheme

- lithium / Li
- 1

(b)(ii)

Mark scheme

- francium / Fr
- 1

Solution 5

(b)(iii)

Mark scheme

- lithium / Li
- 1

(b)(iv)

Mark scheme

- potassium / K
- 1

Solution 5

(b)(v)

Mark scheme

- potassium / K
- 1

Solution 5

(c)

Mark scheme

- M1 8 dots in second shell of each Na M2
- 6 crosses and 2 dots in third shell of S M3
- '+' charge on each Na ion on correct answer line and '2-' charge on S ion on correct answer line
- 3

Solution 5

(d)(i)

Mark scheme

- isotopes
- 1

Solution 5

(d)(ii)

Mark scheme

- mark by row
- $p = 37$ and 37
- $n = 48$ and 50
- $e = 37$ and $36/3$

Solution 5

(d)(iii)

Mark scheme

- 75(%)
- 1
- 0620/42
- May/June 2025