

Past-paper walk-through

Group VII properties ■ 8.3

eXercise

Questions in this set

- 0620/21 N25 Q25 ■ 1 mark
- 0620/22 N25 Q24 ■ 1 mark
- 0620/21 J25 Q22 ■ 1 mark
- 0620/22 J25 Q23 ■ 1 mark
- 0620/22 J25 Q24 ■ 1 mark
- 0620/22 M25 Q26 ■ 1 mark
- 0620/42 M25 Q3 ■ 13 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 25

0620/21 N25 ■ Q25 ■ 1 mark

25 Some halide ions are displaced from aqueous potassium halides by halogens.

In which mixtures are the halide ions displaced?

- 1 potassium bromide and chlorine
- 2 potassium bromide and iodine
- 3 potassium iodide and chlorine
- 4 potassium chloride and iodine

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

Solution 25

Answer: **A**

Why

- A halogen displaces a halide only if the halogen is *higher* in Group VII.
- Chlorine is above bromine and above iodine, so it displaces both.
- Iodine is below bromine, so it cannot displace bromide.

Question 24

0620/22 N25 ■ Q24 ■ 1 mark

24 Which row describes the colour and state of iodine at room temperature and pressure?

	colour	state
A	green	liquid
B	grey-black	solid
C	purple	solid
D	red-brown	liquid

Solution 24

Answer: **B**

Why

- Down Group VII the elements get darker and change from gas to liquid to solid.
- Iodine is the last of the common halogens, so it is a solid.
- It is grey-black with a shiny lustre – its *vapour* is the purple one.

Question 22

0620/21 J25 ■ Q22 ■ 1 mark

22 Which property decreases down Group VII of the Periodic Table, from chlorine to iodine?

- A** atomic number
- B** density
- C** reactivity
- D** melting point

Solution 22

Answer: **C**

Why

- Atomic number, density and melting point all *increase* down Group VII.
- Reactivity decreases, because a larger atom attracts an extra electron less strongly.
- So chlorine is more reactive than iodine.

Question 23

0620/22 J25 ■ Q23 ■ 1 mark

23 Tennessine (atomic number 117) is a manufactured element that is below astatine in Group VII of the Periodic Table.

What is the expected state of tennessine at room temperature and pressure?

- A** a diatomic gas
- B** a liquid
- C** a monatomic gas
- D** a solid

Solution 23

Answer: **D**

Why

- Down Group VII the elements change from gas (F_2 , Cl_2) to liquid (Br_2) to solid (I_2).
- Astatine is already a solid, and tennessine is below it.
- So tennessine is expected to be a solid at room temperature.

Question 24

0620/22 J25 ■ Q24 ■ 1 mark

24 When chlorine is bubbled into aqueous sodium bromide, a displacement reaction occurs.

Which description of this reaction is correct?

- A** Chloride displaces bromide.
- B** Chlorine displaces bromine.
- C** Chloride displaces bromine.
- D** Chlorine displaces bromide.

Solution 24

Answer: **B**

Why

- A more reactive halogen displaces a less reactive one from its salt.
- Chlorine is above bromine, so chlorine takes the electrons and bromine is set free.
- It is the *element* chlorine that does the displacing and the *element* bromine that appears.

Question 26

0620/22 M25 ■ Q26 ■ 1 mark

26 Tennessine, Ts, is at the bottom of Group VII of the Periodic Table.

What are the predicted properties of tennessine at room temperature?

- A** a black solid, more dense than iodine
- B** a black solid, more reactive than iodine
- C** a colourless gas, less dense than chlorine
- D** a colourless gas, less reactive than chlorine

Solution 26

Answer: **A**

Why

- Down Group VII the elements get darker and denser, changing from gas to liquid to solid.
- So tennessine would be a dense black solid at room temperature.
- But reactivity *decreases* down the group, so it would be less reactive than iodine.

Question 3

0620/42 M25 ■ Q3 ■ 13 marks

3 The halogens are a group of elements in the Periodic Table.

Chlorine is a member of this group.

(a) State the group number of the halogens.

Question 3

(b) State how many halogens there are in this group.

Question 3

- (c) Suggest the identity of the halogen which:
- (i) has the highest density

Question 3

(ii) is the most reactive.

Question 3

(d) State the name of the negative ions (anions) formed by halogens.

Question 3

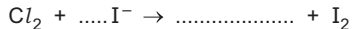
(e) State how many occupied electron shells there are in a bromine atom.

Question 3

- (f) Name the noble gas which has the same electronic configuration as a Br^- ion.

Question 3

- (g) Aqueous chlorine, Cl_2 , reacts with aqueous potassium iodide, KI. One of the products formed is iodine, I_2 .
- (i) Complete and balance the ionic equation for the reaction between Cl_2 and I^- ions. State symbols are **not** required.



[2]

- (ii) Explain why this reaction is defined as a redox reaction. Give your answer in terms of electron transfer.

Question 3

(h) Give the colour and state of iodine at room temperature and pressure.

Question 3

Question 3

[2]

[Total: 12] -

Solution 3

(a)

Mark scheme

- VII
- 1

Solution 3

(b)

Mark scheme

- 6
- 1

Solution 3

(c)(i)

Mark scheme

- tennessine / Ts / Ts2
- 1

(c)(ii)

Mark scheme

- fluorine / F / F2
- 1

Solution 3

(d)

Mark scheme

- halide(s)
- 1

Solution 3

(e)

Mark scheme

- 4
- 1

Solution 3

(f)

Mark scheme

- krypton
- 1

Solution 3

(g)(i)

Mark scheme

- $\text{Cl}_2 + 2\text{I}^- \rightarrow 2\text{Cl}^- + \text{I}_2$ (M1)
- Cl^- (M2)
- correct ionic equation
- 2

Solution 3

(g)(ii)

Mark scheme

- M1 I⁻ loses e⁻ M2
- Cl₂ gains e⁻
- 2

Solution 3

(h)

Mark scheme

- M1 grey-black **M2**
- solid
- 2
- 0620/42
- February/March 2025