

Group 7 Halogens and Halides Past Paper Questions IGCSE Edexcel

1.

Bromine, chlorine, fluorine and iodine are elements in Group 7 of the Periodic Table.

(a) Which element is the most reactive?

(1)

- A bromine
- B chlorine
- C fluorine
- D iodine

(b) Which element is a solid at room temperature?

(1)

- A bromine
- B chlorine
- C fluorine
- D iodine

(c) Which element has the darkest colour at room temperature?

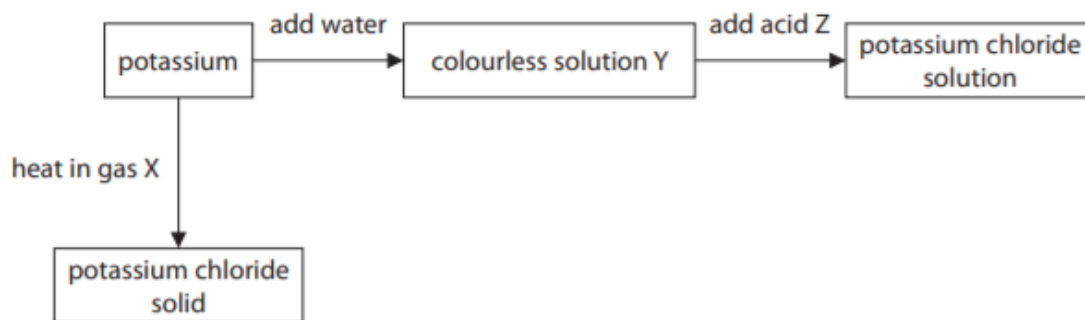
(1)

- A bromine
 - B chlorine
 - C fluorine
 - D iodine
-

2.

6 This question is about elements in Groups 1 and 7 of the Periodic Table.

(a) The diagram shows two ways in which potassium can be converted into potassium chloride.



Give the names of gas X, colourless solution Y and acid Z.

(3)

gas X.....

colourless solution Y.....

acid Z.....

(b) When sodium is burned in iodine gas, sodium iodide is formed.

(i) Write a chemical equation for the reaction between sodium and iodine.

(1)

.....

(ii) Give a test to show that an aqueous solution of sodium iodide contains iodide ions.

(3)

test for iodide ions.....

.....

.....

observation.....

3.

Bromine, chlorine and iodine are elements in Group 7 of the Periodic Table.

- (a) Place ticks (✓) in the boxes to show the three correct statements about the elements in Group 7.

(3)

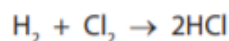
the elements can be obtained by electrolysis of molten metal halides	
the elements with paler colours are lower down the group	
the boiling points decrease down the group	
the elements form covalent compounds with other non-metals	
their molecules contain two atoms	
all are gases at room temperature	

- (b) Group 7 elements are called halogens because they react with metals to form salts.

Write a chemical equation to show the formation of the salt potassium iodide from a metal and a halogen.

(1)

- (c) The equation for the reaction between hydrogen and chlorine is



At room temperature, hydrogen chloride and hydrochloric acid can both be represented by the formula HCl.

Insert the state symbol after each formula.

(2)

hydrogen chloride, HCl(.....)

hydrochloric acid, HCl(.....)

(d) Hydrogen chloride is dissolved in methylbenzene.

When a piece of magnesium ribbon is then added to this solution there is no reaction.

When water is added to this mixture and it is shaken, a reaction occurs.

Explain the observation in this reaction.

(3)

(e) Halogens can take part in displacement reactions with halides.

The table gives information about the addition of halogen solutions to halide solutions.

Test	Halogen solution added	Halide solution	Result
1	bromine	sodium iodide	displacement reaction occurs
2	chlorine	sodium chloride	no reaction
3	iodine	sodium chloride	no reaction

(i) Explain which test gives a result that **cannot** be used to compare the reactivities of halogens.

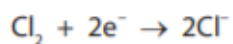
(2)

(ii) Which observation shows that a displacement reaction occurs in test 1? (1)

- A effervescence is seen
- B purple fumes appear
- C the solution becomes darker
- D a white precipitate forms

(f) Astatine is an element in Group 7 that could also be involved in displacement reactions.

The ionic half-equations for one of these reactions would be



(i) Write an ionic equation for this displacement reaction. (1)

(ii) Explain, with reference to the appropriate species and to electrons, why this reaction is described as a redox reaction. (2)

4.

Bromine is an element in Group 7 of the Periodic Table.

(a) Which of these is the formula for a molecule of bromine?

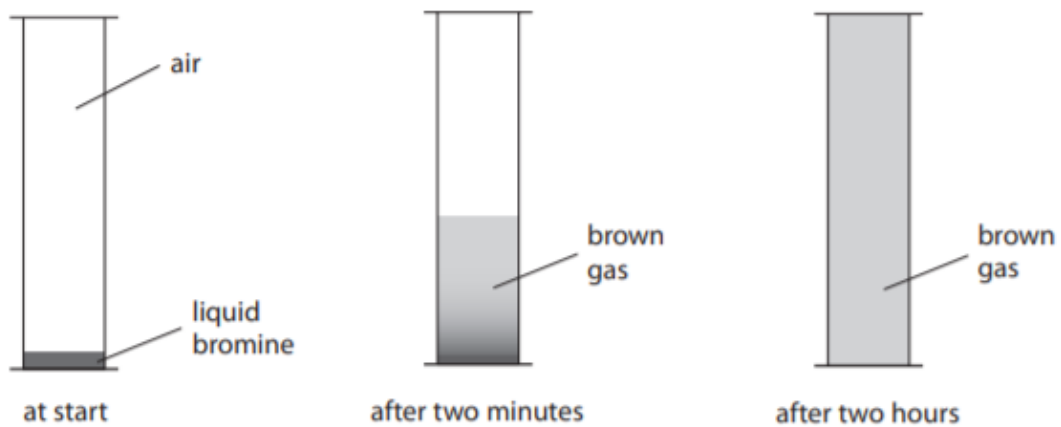
(1)

- A 2Br
- B Br²
- C Br₂
- D Br₂

(b) A small amount of liquid bromine is placed in a gas jar containing air.
The jar is then sealed.

After two minutes, a brown gas is seen just above the surface of the liquid.

After two hours, the whole gas jar is full of the brown gas.



(i) Which of these is the process that causes the brown gas to fill the gas jar?

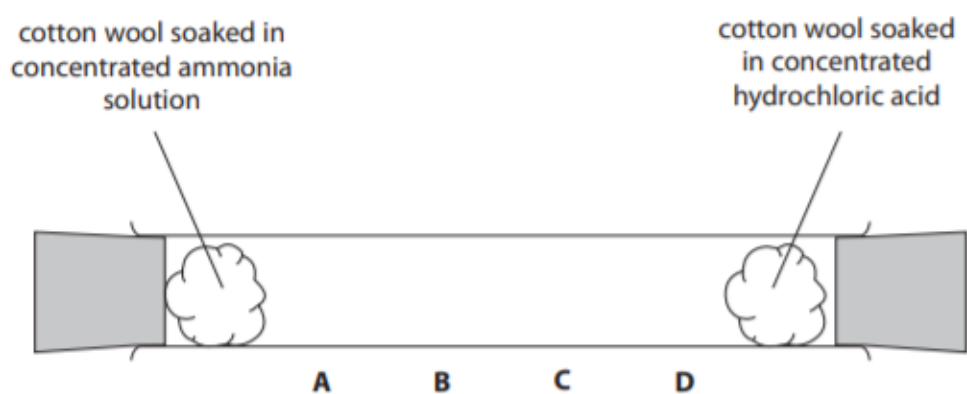
(1)

- A condensation
- B diffusion
- C evaporation
- D sublimation

(ii) Explain, using the particle theory, the observations seen in the gas jar.

(2)

(c) This apparatus is used to demonstrate the movement of ammonia gas and hydrogen chloride gas.



The gases are given off by the solutions at each end of the tube.

When the gases meet, they form a white solid.

Which letter shows the position where the white solid forms?

(1)

- A
- B
- C
- D

5.

Bromine is an element in Group 7 of the Periodic Table.

(a) What is the name given to the Group 7 elements?

(1)

- A alkali metals B alkaline earth metals C halogens D noble gases

(b) The symbols of two isotopes of bromine are ${}^{79}_{35}\text{Br}$ and ${}^{81}_{35}\text{Br}$.

(i) State what is meant by the term **isotopes**.

(2)

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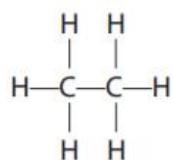
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(ii) Complete the table to show the number of protons, neutrons and electrons in one atom of ${}^{79}_{35}\text{Br}$ and in one atom of ${}^{81}_{35}\text{Br}$.

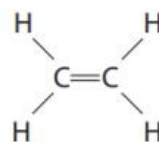
(3)

Isotope	Number of protons	Number of neutrons	Number of electrons
${}^{79}_{35}\text{Br}$			
${}^{81}_{35}\text{Br}$			

(c) Bromine water can be used to distinguish between ethane and ethene.



ethane



ethene

Describe what you would observe when orange bromine water is added separately to ethane and ethene, in the absence of UV light.

(2)

observation with ethane.....

observation with ethene.....

6.

This question is about halogens and halides.

(a) At room temperature bromine is

(1)

- A** a brown gas
- B** a red-brown liquid
- C** a colourless liquid
- D** a grey solid

(b) Sodium reacts with bromine to form sodium bromide.

Balance the equation for this reaction.

(1)



(c) A student carries out some experiments to investigate displacement reactions.

She adds some halogen solutions to halide solutions and observes whether a reaction occurs.

The table shows her results.

Halide solution	Halogen solution added		
	bromine	chlorine	iodine
lithium chloride	no reaction	(not done)	no reaction
sodium bromide	(not done)	reaction occurs	no reaction
potassium iodide	reaction occurs	reaction occurs	(not done)

(i) The table shows that she did not do three experiments.

Suggest why she did not do these experiments.

(1)

.....

.....

.....

.....

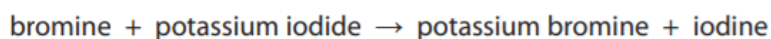
(ii) The table shows that there was no reaction in three experiments.

Why was there no reaction in these experiments?

(1)

.....

- (iii) The student writes this word equation for one of the experiments in which a reaction occurs.



The name of one of the substances is incorrect.

Write the correct name of this substance.

(1)

- (iv) A reaction occurs when the student adds chlorine solution to potassium iodide solution.

Complete the chemical equation for this reaction.

(2)

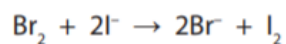


- (v) All displacement reactions are examples of redox reactions.

State the meaning of the term **redox**.

(1)

- (vi) The ionic equation for another reaction is



Explain which species is oxidised in this reaction.

(2)

7.

Bromine and iodine are halogens.

- (a) Complete the table by giving the colour and physical state of each of these halogens at room temperature.

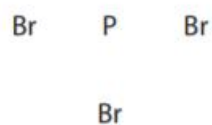
(2)

Halogen	Colour	Physical state
bromine	red-brown	
iodine		solid

- (b) Bromine reacts with phosphorus to form the covalent compound phosphorus tribromide.

Draw a dot and cross diagram to show the outer electrons in a molecule of phosphorus tribromide.

(2)



- (c) Phosphorus tribromide reacts with water to form a mixture of two acids, HBr and H_3PO_3 .

Write a chemical equation for this reaction.

(2)

8.

8 A student is supplied with aqueous solutions of these substances.

- bromine
- chlorine
- iodine
- potassium bromide
- potassium chloride
- potassium iodide

Describe two experiments the student could perform, using some of the solutions, to show the order of reactivity of bromine, chlorine and iodine.

Your answer should include the observations that the student would expect to make, and a chemical equation for one of the reactions.

(5)

9.

This question is about elements in Group 7 of the Periodic Table.

- (a) Complete the table to show the physical state at room temperature of fluorine and astatine, and the colour of liquid bromine.

(2)

Element	Colour	Physical state at room temperature
fluorine	pale yellow	
chlorine	pale green	gas
bromine		liquid
iodine	dark grey	solid
astatine	black	

- (b) Chlorine reacts with hydrogen to form hydrogen chloride.

A piece of magnesium ribbon is added to hydrogen chloride in three separate experiments under different conditions.

The table below shows the observations made under these different conditions.

Experiment	Conditions	Observations
1	Hydrogen chloride gas	No visible change
2	Hydrogen chloride dissolved in water	The magnesium ribbon gets smaller and bubbles are seen
3	Hydrogen chloride dissolved in methylbenzene	No visible change

- (i) Write the formulae of two ions formed in the solution produced in experiment 2.

(2)

Positive ion.....

Negative ion.....

(ii) Identify the gas formed in experiment 2 and give a test for it.

(2)

gas.....

test.....

(iii) Silver nitrate solution and dilute nitric acid are added to the solution produced in experiment 2.

State what is observed and name the substance responsible for this observation.

Explain why dilute nitric acid is added.

(3)

observation.....

substance responsible.....

explanation.....

(iv) Explain why there is no reaction in experiment 3.

(1)
