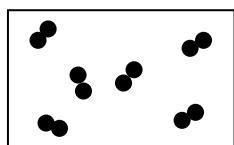


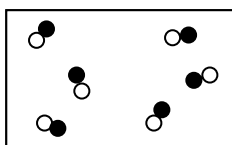
High Demand Questions

QUESTIONSHEET 1

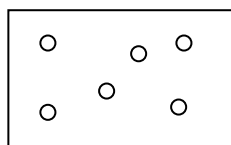
The boxes represent particles of different gases. One box shows the particles of elements in group 0 (group 8).



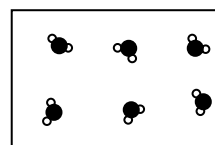
A



B



C



D

- (a) (i) What name is given to group 0 (8) elements?

..... [1]

- (ii) Name two elements from group 0.

..... [2]

- (b) (i) Which box best represents particles from group 0 elements?

..... [1]

- (ii) Explain the reason for your answer.

..... [1]

- (c) A lighted splint is put into a gas jar of helium. What would happen?

..... [1]

- (d) Some properties of elements change as you go down their group in the periodic table. For each property listed below, comment on if and how it changes as you go down group 0.

- (i) reactivity

..... [1]

- (ii) density

..... [1]

- (iii) metal or non-metal

..... [1]

- (e) Which would be the best method to distinguish between different samples of group 0 gases?
Choose from the list below:

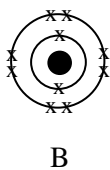
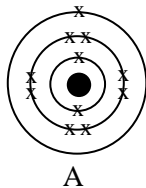
- (i) shake the sample with water and add an indicator,
(ii) do a flame test,
(iii) put a lighted splint into a sample of each gas,
(iv) measure the density of each.

..... [1]

High Demand Questions

QUESTIONSHEET 2

The diagram represents a sodium atom and a sodium ion.



- (a) (i) Which diagram represents the sodium atom?

..... [1]

- (ii) Give reasons for your choice.

..... [2]

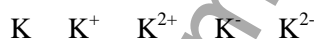
- (iii) Sodium is in group 1 of the periodic table. How can you tell this from its electron structure?

..... [1]

- (b) (i) What is an ion?

..... [1]

- (ii) Potassium is also in group 1 of the periodic table. What is the symbol for the potassium ion?
Choose from:



..... [1]

- (c) Group 1 elements are stored in oil. Suggest the reason for this.

..... [2]

- (d) A small piece of potassium is taken out of its bottle and cut. The surface is silver coloured and shiny, but after a few minutes it looked dull and white. A chemical reaction had taken place.

- (i) With what had the potassium reacted?

..... [1]

- (ii) What is the name of the substance formed on the outside of potassium?

..... [1]

- (iii) Write a word equation for the reaction.

..... [1]

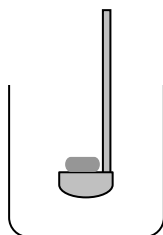
- (iv) Write a balanced symbol equation for this reaction.

..... [2]

High Demand Questions

QUESTIONSHEET 3

Lithium (Li) can be burnt in chlorine (Cl₂) to give lithium chloride.



(a) (i) Write a word equation for the reaction.

..... [1]

(ii) Write a balanced symbol equation for the reaction.

..... [1]

(b) (i) Which group in the periodic table does lithium belong to?

..... [1]

(ii) How many electrons are there in its outside shell?

..... [1]

(iii) How many electrons are there in the outside shell of the chlorine?

..... [1]

(c) Use a 'dot and cross' diagram to explain how lithium and chlorine react together. Show only the electrons in the outer shell.

[3]

(d) Sodium also reacts with chlorine.

(i) Will the reaction be more reactive or less reactive than with lithium?

..... [1]

(ii) What is the common name of the product?

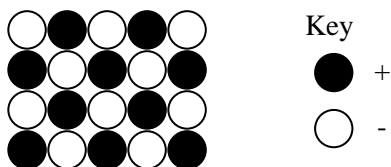
..... [1]

TOTAL / 10

High Demand Questions

QUESTIONSHEET 4

The diagram below shows the arrangement of particles in a crystal of sodium chloride.



- (a) (i) Each particle has a charge. What type of particles have a charge?
Choose from:

atoms, molecules, ions.

..... [1]

- (ii) In sodium chloride what is the name of the particle with the positive charge?

..... [1]

- (iii) What is the name of the particle with the negative charge?

..... [1]

- (iv) What holds the particles together?

..... [1]

- (b) The table below gives some information about sodium and chlorine. Complete the table.

element	symbol	electron arrangement	number of electrons in outside shell	number of electron shells	periodic table group number
Sodium	Na	2.8.1	(i)	(iii)	(v)
Chlorine	Cl	2.8.7	(ii)	(iv)	(vi)

[6]

- (c) Use the information in the table to explain:

- (i) why sodium chloride has positively and negatively charged particles. (Use dot and cross diagrams to help your explanation.)

.....

..... [5]

- (ii) why the formula for sodium chloride is NaCl.

.....

..... [1]

TOTAL / 16

Sarah is diving into a swimming pool. She can smell chlorine.



(a) (i) Explain why there is chlorine in the swimming pool.

..... [1]

(ii) Iodine is the same group of the periodic table as chlorine. Give a use of iodine.

..... [1]

(b) (i) Chlorine and iodine are in group 7 of the periodic table. What name is given to group 7 elements?

..... [1]

(ii) Is chlorine a metal or non-metal?

..... [1]

(iii) Is iodine a metal or non-metal?

..... [1]

(c) (i) The atomic number of chlorine is 17. What does this tell you?

..... [1]

(ii) The electron arrangement of chlorine is 2.8.7. How many electron shells does it have?

..... [1]

(iii) Iodine has five electron shells. How many electrons are in the outer shell of iodine?

..... [1]

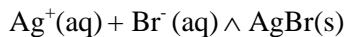
(iv) The symbol for chlorine is Cl, iodine is I and sodium Na. Chlorine combines with sodium to make sodium chloride, NaCl. Iodine also reacts with sodium. What will be the name and formula of the compound formed?

..... [2]

High Demand Questions

QUESTIONSHEET 6

Emma takes a photograph of a friend. Her friend tells her that the film is coated with silver bromide which is sensitive to light. Silver bromide can be made by reacting silver nitrate with sodium bromide. The chemical reaction can be represented as:



(a) (i) What happens to silver bromide in the light?

..... [1]

(ii) Give another reaction which is affected by light energy.

..... [1]

(b) (i) What type of particle is Br^- ?

..... [1]

(ii) Is silver bromide soluble in water?

..... [1]

(c) (i) Suggest what would happen if a sample of silver iodide were left in the light.

..... [1]

(ii) Silver iodide can be made in a similar way to silver bromide. Write an ionic equation to show this reaction. Include the state symbols.

..... [3]

High Demand Questions

QUESTIONSHEET 7

The symbols represent two different forms of chlorine atoms.



- (a) (i) What name is given to atoms of the same element that have different mass numbers?

..... [1]

- (ii) Why do the atoms have different mass numbers?

..... [1]

- (iii) What **two** things does the number 17 tell you about the structure of a chlorine atom?

..... [2]

- (iv) Calculate the number of neutrons in an atom of chlorine-35.

..... [2]

- (b) A sample of chlorine is found to have a mass of 35.5. Explain why it is not a whole number.

..... [1]

- (c) (i) A small amount of sodium was burnt in samples of chlorine-35 and chlorine-37. What difference, if any, would you expect between the reactions?

..... [1]

- (ii) Explain your answer.

..... [2]

- (iii) Would chlorine-35 and chlorine-37 have the same boiling point?

..... [1]

- (iv) Give a reason for your answer.

..... [1]

High Demand Questions

QUESTIONSHEET 8

The table below shows the elements on the third period. Samples of each of the elements were burnt in oxygen and the oxides formed were tested to see whether they were acids or bases.

11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulphur 32	17 Cl chlorine 35.5	18 Ar argon 40
--------------------------	-----------------------------	-----------------------------	---------------------------	-----------------------------	--------------------------	------------------------------	-------------------------

(a) (i) How many electron shells does the third period have?

..... [1]

(ii) The element with atomic number 10 is neon. Explain in terms of electron arrangement why a new period starts after neon.

.....

..... [2]

(b) (i) Which three elements in the third period are metals?

..... [1]

(ii) What trend do you notice about metallic properties as you go across the period?

..... [1]

(c) (i) Oxygen is in group 6. What does this tell you about the number of electrons in the outside shell?

..... [1]

(ii) Write down formulae for the oxides of sodium, magnesium and aluminium.

.....

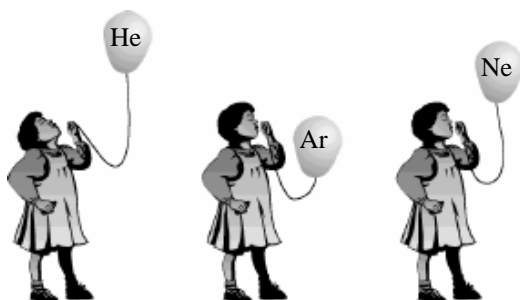
.....

..... [3]

Medium Demand Questions

QUESTIONSHEET 9

Farah has balloons filled with three different gases. The symbols for the gases are written on each balloon. She lets go of the balloons. The diagram shows what happens.



(a) To which group of the periodic table do the gases belong?

..... [1]

(b)(i) Predict what would happen to a balloon filled with krypton.

..... [1]

(ii) Explain the reasons for your answer.

.....

 [2]

(c)(i) Draw the electron structure of helium.

..... [1]

(ii) Explain how the electron structure is related to the chemical properties of helium.

..... [2]

(d)(i) Helium is often used to fill balloons. Give **two** reasons why this is a good choice.

..... [2]

(ii) Neon, argon and krypton are used to fill light bulbs. Give a reason for this.

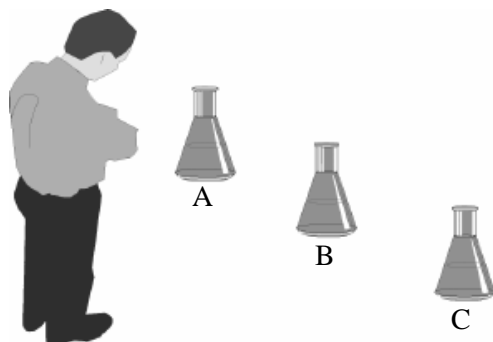
..... [2]

TOTAL / 11

Medium Demand Questions

QUESTIONSHEET 10

John has three bottles containing salts. One contains sodium chloride, one lithium chloride and one potassium chloride, but the labels have come off.



- (a) (i) Sodium, potassium and lithium all belong to the same group of the periodic table. What is the group number?

..... [1]

- (ii) What is the name of the group?

..... [1]

- (iii) What colour are the three salts?

..... [1]

- (b) John needs to put the correct labels on the bottles. He does a flame test. Describe exactly how he does the flame test.

..... [3]

- (c) John puts his results in a table. Look at the table and fill in the names of the salts.

Bottle	Colour of flame	Name of salt
A	Yellow	
B	Red	
C	Lilac	

[3]

Medium Demand Questions

QUESTIONSHEET 11

The table below gives information about some of the elements in group 7.

Element	Symbol	Atomic No.	Melting point (°C)	Boiling point (°C)	Appearance
chlorine	Cl	17	-101	-34	greenish gas
bromine	Br	35	-7	58	red liquid
iodine	I	53	114	183	black solid

(a) (i) Put the three elements in the table in their order of reactivity, with the most reactive first.

..... [1]

(ii) Which property in the table above indicated the order of reactivity for group 7 elements?

..... [1]

(b) (i) How many electrons are in the outside shell of a chlorine atom?

..... [1]

(ii) Does the element chlorine usually exist as free atoms, molecules or ions?

..... [1]

(iii) Explain your answer to (ii).

.....

..... [2]

(c) Fluorine is also in group 7. Its atomic number is 9.

(i) Draw the electron arrangement for fluorine.

[2]

(ii) Would you expect fluorine to be a solid, liquid or gas at room temperature?

..... [1]

(iii) Predict what its melting point would be.

..... [1]

(d) A sample of bromine is put in a test tube in a water bath at 60 °C. Suggest what will happen to it.

..... [1]

TOTAL / 11

Medium Demand Questions

QUESTIONSHEET 12

Abdul adds some silver nitrate (AgNO_3) solution to a sodium chloride (NaCl) solution. He notices a white precipitate. He leaves the test tube in bright sunlight. The precipitate went dark.



(a) (i) What colour is the sodium chloride solution?

..... [1]

(ii) What is meant by 'precipitate'?

.....
 [2]

(iii) What is the name of the precipitate made?

..... [1]

(b) (i) Write a word equation for the reaction.

..... [1]

(ii) What is the state symbol for a solution in water?

..... [1]

(iii) What is the state symbol for a precipitate?

..... [1]

(iv) Write a symbol equation for the reaction, including the state symbols.

..... [2]

(c) Abdul adds some silver nitrate to three more solutions, A, B and C. He puts the results in a table. Put a tick in the column if there was a halide present.

solution	observation	observation after leaving in sunlight	was a halide present?
A	no reaction	no change	
B	pale yellow precipitate	went dark	
C	yellow precipitate	went dark	

[2]

TOTAL / 11

Medium Demand Questions

QUESTIONSHEET 13

Below is the first part of the periodic table, giving the elements with their atomic numbers.

															0		
										H 1						He 2	
I	II									III	IV	V	VI	VII			
Li 3	Be 4									B 5	C 6	N 7	O 8	F 9	Ne 10		
Na 11	Mg 12									Al 13	Si 14	P 15	S 16	Cl 17	Ar 18		
K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36

(a) (i) What is the name given to the group between atomic number 21 and 30?

..... [1]

(ii) Are they metals or non-metals?

..... [1]

(iii) What do the following symbols stand for?

Fe: Cu: Zn: [3]

(b) Below are some properties of two elements.

element	melting point	boiling point	relative density
A	1535	2750	7.87
B	97.5	892	0.97

(i) Which element is from the group between atomic numbers 21 and 30?

..... [1]

(ii) Using the properties in the table, suggest which elements would be most suitable for making a kettle. Give a reason for your answer.

..... [2]

(iii) Element number 22 is called titanium. From its position in the periodic table predict three properties you would expect it to have. Put a tick in the box by one property from each pair in the list below.

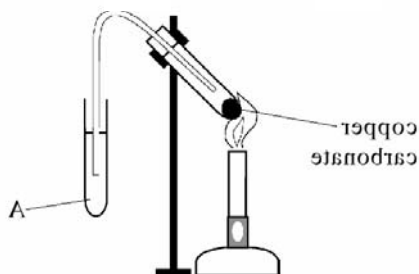
- | | |
|---|---|
| <input type="checkbox"/> soft | <input type="checkbox"/> hard |
| <input type="checkbox"/> can be pulled out to make a wire | <input type="checkbox"/> breaks easily when pulled |
| <input type="checkbox"/> dull surface that cannot be polished | <input type="checkbox"/> shiny surface that can be polished |

[3]

Medium Demand Questions

QUESTIONSHEET 14

Saima heated some copper(II) carbonate (CuCO_3) in a test tube. She noticed that the green copper carbonate changed to a black powder. A gas also came off which she passed through a liquid, A.



(a) (i) Copper is a transition element. Name another element from this part of the periodic table.

..... [1]

(ii) What is liquid A?

..... [1]

(iii) Describe what Saima saw happening in A.

.....
..... [1]

(iv) What is the name of the gas?

..... [1]

(b) (i) What is the name of the black powder formed?

..... [1]

(ii) Saima thinks that a chemical reaction has taken place. Give two pieces of evidence to support her idea.

.....
..... [2]

(iii) Write a word equation for the reaction.

..... [1]

(iv) Write a balanced symbol equation for the reaction.

..... [1]

(Continued...)

QUESTIONSHEET 14 CONTINUED

- (c) Saima heated two more carbonates, zinc carbonate and sodium carbonate. She put her results in the table below.

substance	appearance before heating	appearance after heating	gas given off
A	white solid	white solid	no
B	white solid	solid yellow when hot, white when cold	yes

- (i) Which substance was zinc carbonate?

..... [1]

- (ii) Explain the reason for your choice.

.....
.....
..... [2]

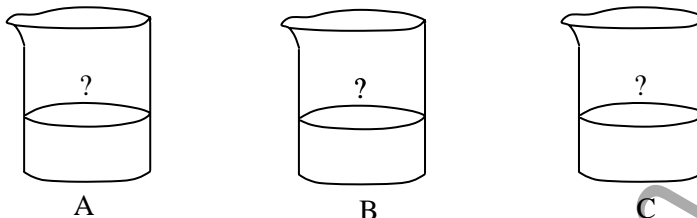
- (iii) Explain why no gas was given off with A.

.....
..... [2]

Medium Demand Questions

QUESTIONSHEET 15

Three jars containing metal salts have lost their labels. One contains a salt of copper, one a salt of iron(II) and one a salt of iron(III). They can be distinguished by testing with sodium hydroxide solution.



(a) (i) To what part of the periodic table do copper and iron belong?

..... [1]

(ii) What is the likely colour of the copper salt?

..... [1]

(b) (i) Describe how to carry out the test with sodium hydroxide, and what you would look for.

.....

 [2]

(ii) The table shows the results of testing the three salts with sodium hydroxide. Complete the table.

salt	colour of precipitate	metal ion in salt
A	blue	
B		iron(II)
C	brown	

[2]

(c) (i) What is the symbol for the iron(II) ion?

..... [1]

(ii) What is the symbol for the hydroxide ion?

..... [1]

(iii) Write a balanced ionic equation to show the reaction between iron(II) ions and hydroxide ions.

..... [1]

Medium Demand Questions

QUESTIONSHEET 16

The table below shows the second and third periods of the periodic table.

I	II	III	IV	V	VI	VII	0
3 Li lithium 7	4 Be beryllium 9	5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulphur 32	17 Cl chlorine 35.5	18 Ar argon 40

(a) (i) The first period is not shown. How many elements are in the first period?

..... [1]

(ii) How many elements are in the second period?

..... [1]

(iii) What does the period number tell you about the arrangement of electrons in the atom?

..... [1]

(b) (i) Find carbon in the table. Which period is it in?

..... [1]

(ii) Which group is it in?

..... [1]

(iii) What does the group number tell you about the structure of the carbon atom?

..... [1]

(c) (i) There are two numbers, 6 and 12, in the box with carbon. 6 is the atomic number. What **two** things does the atomic number 6 tell you about an atom of carbon?

.....

..... [2]

(ii) What is the number 12 called?

..... [1]

(iii) What does the number 12 tell you about the structure of an atom of carbon?

.....

..... [1]

Low Demand Questions

QUESTIONSHEET 17

Below are the first 36 elements in the periodic table with their atomic numbers.

															0					
I		II												H 1						He 2
Li 3	Be 4											B 5	C 6	N 7	O 8	F 9	Ne 10			
Na 11	Mg 12											Al 13	Si 14	P 15	S 16	Cl 17	Ar 18			
K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36			

(a) Give the symbol for one example of each of the following:

(i) a metal

..... [1]

(ii) a gas

..... [1]

(iii) a transition element

..... [1]

(b) Find Cl (chlorine) in the table above.

(i) What is the group number?

..... [1]

(ii) Which period is it in?

..... [1]

(iii) How many electron shells does it have?

..... [1]

(iv) How many electrons are there in its outside shell?

..... [1]

(c) Explain what is meant by 'atomic number'.

..... [1]

(Continued...)

QUESTIONSHEET 17 CONTINUED

(d)(i) What name is given to the elements in group 0?

..... [1]

(ii) What is the main chemical property of group 0 elements?

..... [1]

(iii) How does their electron arrangement explain this chemical property?

..... [1]

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Low Demand Questions

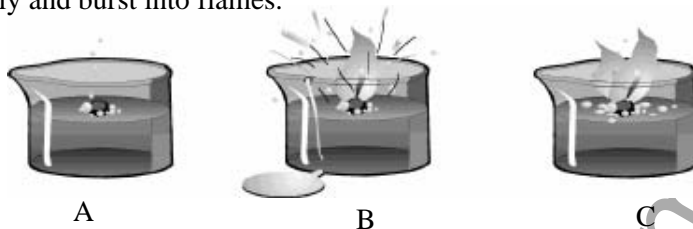
QUESTIONSHEET 18

Group one elements react with water and a gas is given off.

Lithium, potassium and rubidium were put in separate troughs of water, A, B and C. The diagrams show the reactions.

'A' fizzed gently and a gas was given off. 'B' reacted violently, burst into flames and cracked the trough.

'C' reacted vigorously and burst into flames.



(a) Identify the elements A, B and C by completing the sentences below.

(i) The element in A was:

..... [1]

(ii) The element in B was:

..... [1]

(iii) The element in C was:

..... [1]

(b) The solution left in A was tested with litmus paper.
What colour did the litmus paper go?

..... [1]

(c) The gas coming off in A was collected in a test tube and tested with a lighted splint.
What happened?

..... [1]

(ii) What is the name of the gas?

..... [1]

(d) Sodium also reacts with water.

(i) Will the reaction be more or less vigorous than that with lithium?

..... [1]

(ii) What are the names of the products of the reaction?

..... [1]

(e) Group 1 elements are called 'alkali metals'. Suggest the reason for this.

.....

.....

..... [2]

TOTAL / 10

Iron and copper are both transition elements. They can both be used to make pans.



- (a) (i) Give **two** physical properties of most transition elements that make them suitable for pans.

.....
..... [2]

- (ii) Why is copper not often used for pans?

..... [1]

- (iii) Copper is often used for electric wires. Give **two** properties of copper that make copper a good choice for this use.

.....
..... [2]

- (iv) Iron is used to make cars but not aeroplanes.

Give **one** property of iron that makes it good to use for cars.

..... [1]

Give **one** property of iron that makes it unsuitable for planes.

..... [1]

- (b) (i) Iron is used as a catalyst in the Haber process to make ammonia.
What is the purpose of a catalyst?

..... [1]

- (ii) Platinum is used as a catalyst in catalytic converters in cars.
Where in the periodic table would you expect to find platinum?

..... [1]

- (c) (i) Copper and iron both form ions with non-metals. What type of ions do they form?

..... [1]

- (ii) Write the symbols for a copper(II) ion and an iron(III) ion.

..... [2]

