

Questions

Q1.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

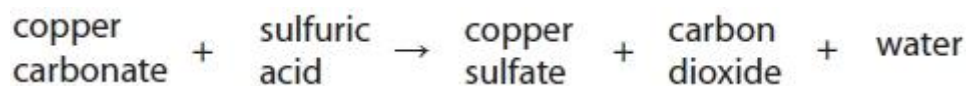
Acids are neutralised by metal hydroxides to form

(1)

- A salt only
- B salt and hydrogen only
- C salt and oxygen only
- D salt and water only

(ii) Acids can also be neutralised by metal carbonates.

Dilute sulfuric acid is neutralised by copper carbonate as shown in the word equation.



Copper carbonate is a green powder.

Describe what you would **see** when copper carbonate powder is added to dilute sulfuric acid.

(2)

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(Total for question = 12 marks)

Q3.

(a) The table shows the number of electrons, neutrons and protons in particles P, Q, R, S, T and V.

particle	number of		
	electrons	neutrons	protons
P	1	0	1
Q	3	4	3
R	8	8	8
S	13	14	13
T	18	16	16
V	18	20	20

(i) Which particle is a negatively charged ion?

Put a cross () in the box next to your answer.

- A** P
- B** S
- C** T
- D** V

(1)

(ii) Which particles are atoms of metals?

Put a cross () in the box next to your answer.

- A** P and R
- B** Q and R
- C** Q and S
- D** Q, S and V

(1)

(b) Each element has an atomic number.

(i) State what is meant by **atomic number**.

(1)

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(ii) The atomic number of boron is 5.

Boron exists as two isotopes boron-10 and boron-11.

Use this information to explain why boron-10 and boron-11 are isotopes.

(2)

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(c) (i) Explain what is meant by the term relative atomic mass.

(2)

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(ii) A sample of boron contains

19.7% of boron-10.

80.3% of boron-11.

Use this information to calculate the relative atomic mass of boron.

(3)

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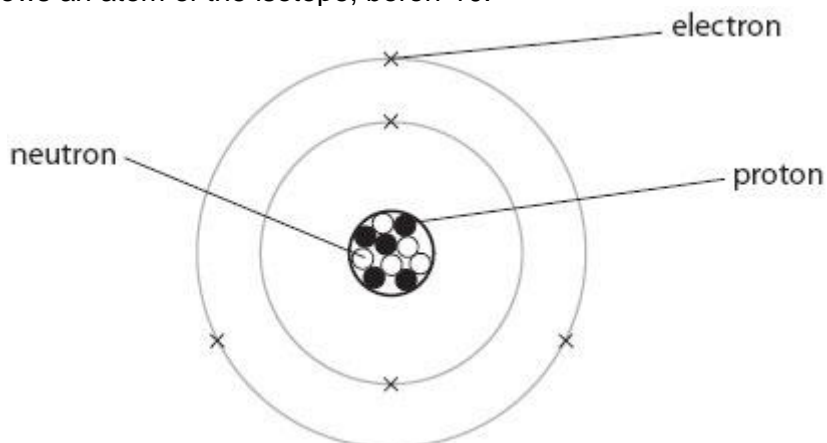
(Total for Question = 10 marks)

Q4.

Boron exists as two isotopes.

These are boron-10, $^{10}_5\text{B}$, and boron-11, $^{11}_5\text{B}$.

The diagram shows an atom of the isotope, boron-10.



(i) State the electronic configuration of boron.

(1)

.....
 (ii) Complete the sentence by putting a cross () in the box next to your answer.

In the periodic table, boron is in period

(1)

- A** 2
- B** 3
- C** 5
- D** 10

(iii) The table shows the three particles present in atoms and their relative masses and charges. Complete the table.

(2)

particle	relative mass	relative charge
electron	$\frac{1}{1837}$	
neutron		
proton		+1

Q5.

Complete the sentence by putting a cross () in the box next to your answer.

(i) The percentage of carbon dioxide in the Earth's atmosphere today is

(1)

- A** greater than 5%
- B** 4%
- C** 3%
- D** less than 0.5%

(ii) The percentage of carbon dioxide in the Earth's atmosphere today is less than that in the Earth's earliest atmosphere.

Explain what has caused the percentage of carbon dioxide to decrease.

(2)

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(iii) Carbon dioxide and other gases in the atmosphere help to keep the Earth warm.

State how these gases keep the Earth warm.

(1)

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Q6.

Acids can undergo neutralisation to form salts.

Complete the sentence by putting a cross () in the box next to your answer.

(1)

An acid reacts with a metal oxide to form

- A** a salt + carbon dioxide
- B** a salt + hydrogen
- C** a salt + oxygen
- D** a salt + water

(Total for question = 1 mark)

Q7.

Copper hydroxide, copper oxide and copper sulfide are three compounds of copper.

(i) In solution copper chloride, CuCl_2 , reacts with potassium hydroxide, KOH , to form copper hydroxide, $\text{Cu}(\text{OH})_2$, and potassium chloride.

Write the balanced equation for this reaction.
State symbols are not required.

(3)

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(ii) Copper hydroxide is formed as a precipitate.

Which state symbol would be used in the equation to show that copper hydroxide is a precipitate?
Put a cross (☒) in the box next to your answer.

(1)

- A (aq)
- B (g)
- C (l)
- D (s)

(Total for question = 4 marks)

Q8.

A sample of gallium, Ga, contains the isotopes gallium-69 and gallium-71.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

Isotopes are different atoms of the same element that contain

- A different numbers of electrons
- B different numbers of protons but same number of electrons
- C same number of protons but different numbers of neutrons
- D same number of neutrons

(ii) The sample of gallium contains
60.2% of gallium-69
39.8% of gallium-71
Calculate the relative atomic mass of gallium.

(3)

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(Total for question = 4 marks)

Q9.

Carbon dioxide dissolves in the water in the Earth's oceans.

Describe how these oceans were originally formed.

(2)

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(Total for question = 2 marks)

Q10.

An atom of potassium has an atomic number of 19 and a mass number of 39.

(i) Complete the table to show the number of protons, neutrons and electrons in this potassium atom.

(2)

number of		
protons	neutrons	electrons

(ii) Describe the positions of these particles in the potassium atom.

(2)

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(iii) State the electronic configuration of this potassium atom.

(1)

.....

(iv) Give the relative mass of an electron.

(1)

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(Total for question = 6 marks)

Q11.

The electronic configuration of an atom of an element is 2.8.5.

Explain, using this electronic configuration, in which group and in which period of the periodic table this element is found.

(4)

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(Total for question = 4 marks)

Q12.

Lithium and caesium are two metals in group 1 of the periodic table.
Caesium is more reactive than lithium.

Explain, in terms of the structure of their atoms, why caesium is more reactive than lithium.

(3)

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(Total for question = 3 marks)

Q13.

For many years, argon was used as the gas in filament light bulbs.



Explain why filament light bulbs were filled with argon rather than left with air inside them.

(2)

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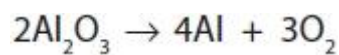
(Total for question = 2 marks)

Q14.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

Aluminium is extracted from aluminium oxide by electrolysis.
The overall equation for this reaction is

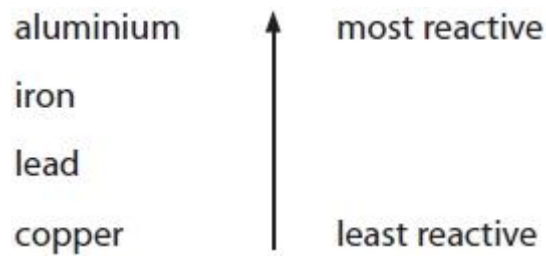


In this reaction

- A** aluminium oxide is oxidised
- B** aluminium oxide is reduced
- C** aluminium metal is reduced

D oxygen gas is oxidised

(ii) Part of the reactivity series is shown



Lead is extracted from its oxide by heating the oxide with carbon rather than by using electrolysis. Explain why.

(2)

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(Total for question = 3 marks)

Q15.

(a) Complete the sentence by putting a cross () in the box next to your answer.

(i) The percentage of carbon dioxide in the Earth's atmosphere today is

(1)

- A** greater than 5%
- B** 4%
- C** 3%
- D** less than 0.5%

(ii) The percentage of carbon dioxide in the Earth's atmosphere today is less than that in the Earth's earliest atmosphere.

Explain what has caused the percentage of carbon dioxide to decrease.

(2)

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(iii) Carbon dioxide and other gases in the atmosphere help to keep the Earth warm.

State how these gases keep the Earth warm.

(1)

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(b) Describe the test to show that a gas is oxygen.

(2)

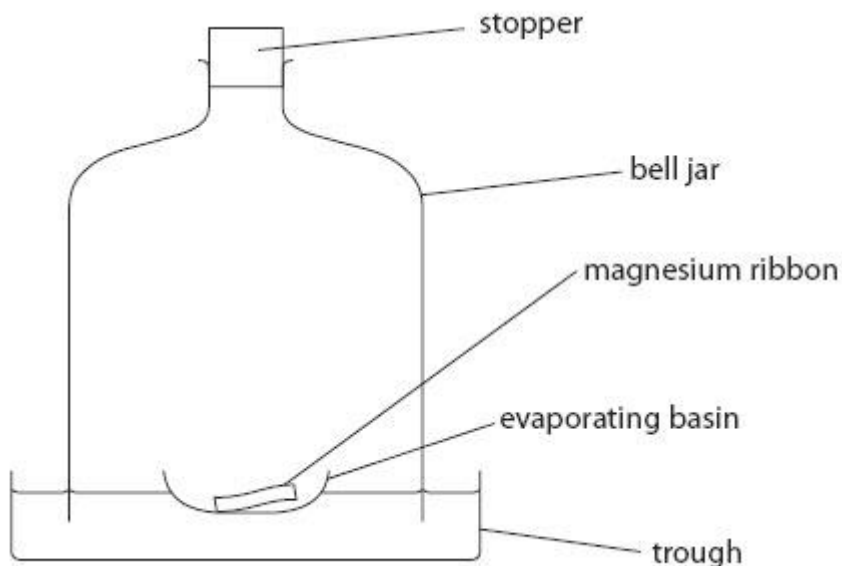
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(c) Magnesium reacts with oxygen to form magnesium oxide.

An excess of magnesium ribbon was placed in an evaporating basin that was floated on water in a trough.

The magnesium ribbon was lit.

A bell jar was placed over the evaporating basin and the stopper inserted to seal the experiment.



When the magnesium flame went out, there was some magnesium left in the basin.

When the apparatus had cooled, the water in the bell jar had risen.

(i) Explain why the water level had risen.

(2)

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(ii) At the start of the experiment, the volume of the air in the bell jar was 1000 cm^3 .
Assume that 21% of the air by volume is oxygen.
Calculate the volume of gas that was present in the bell jar at the end of the experiment.

(2)

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volume of gas = cm^3

(d) Metal oxides react with acids to produce salts and water.
Dilute sulfuric acid was added to magnesium oxide.
State the name of the salt formed.

(1)

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(Total for Question = 11 marks)

- A $2\text{Cl} + \text{KBr} \rightarrow \text{KCl} + \text{Br}_2$
- B $\text{Cl}_2 + \text{KBr} \rightarrow \text{KCl} + \text{Br}_2$
- C $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$
- D $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + 2\text{Br}$

(Total for question = 1 mark)

Q18.

Which of these substances is insoluble in water?

Put a cross (☒) in the box next to your answer.

- A ammonium carbonate
- B copper nitrate
- C lead sulfate
- D potassium hydroxide

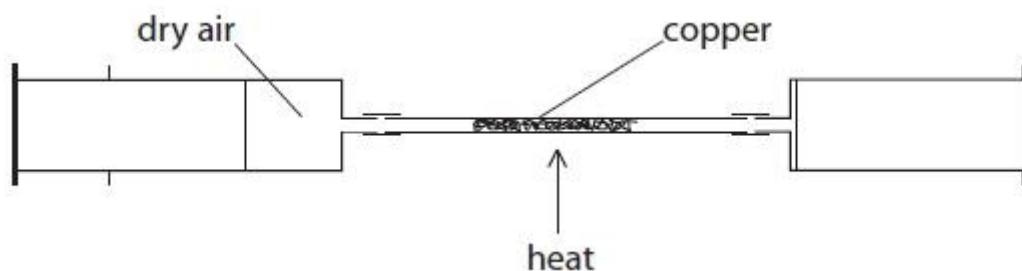
(1)

(Total for question = 1 mark)

Q19.

In an experiment, dry air is passed backwards and forwards over hot, excess copper in the apparatus shown.

The oxygen in the air reacts with the hot copper to form copper oxide, CuO.



(i) Write the balanced equation for the reaction of copper with oxygen.

(3)

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(ii) When the copper has reacted with all the oxygen, the apparatus is allowed to cool.

The initial volume of dry air in the apparatus was 50 cm^3 , measured at room temperature and pressure.

During the experiment the volume of gas in the apparatus decreased.

Calculate the final volume of gas remaining in the apparatus after allowing it to cool to room temperature.

(percentage of oxygen in dry air is 21%)

(2)

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.....

final volume of gas remaining in apparatus = cm^3

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

After the reaction between dry air and copper is complete, most of the gas remaining in the apparatus is

(1)

- A argon
- B carbon dioxide
- C nitrogen
- D oxygen

Q20.

Particles and formulae

(a) Atoms contain protons, neutrons and electrons.

Complete the table to show the relative mass and relative charge of each particle and its position in an atom.

(3)

	relative mass	relative charge	position in atom
proton		+1	
neutron	1		in nucleus
electron			

(b) Complete the sentence by putting a cross (X) in the box next to your answer.

An atom of an element **always** contains

(1)

- A more protons than neutrons
- B equal numbers of protons and neutrons
- C more electrons than protons
- D equal numbers of protons and electrons

(c) The symbols for some atoms are given in the box

Ca	Cl	K	N	Ne	O
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From the box, choose the symbol of

(i) an atom in group 2 of the periodic table

(1)

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(ii) an atom that readily forms an ion with a charge of 2-

(1)

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(d) The formula of aluminium nitrate is $\text{Al}(\text{NO}_3)_3$

(i) State the total number of atoms in the formula $\text{Al}(\text{NO}_3)_3$

(1)

.....

(ii) What is the most likely formula of aluminium nitride?

Put a cross (X) in the box next to your answer.

(1)

- A $\text{Al}(\text{NO}_3)_2$
- B AlNO_3
- C AlNO_2
- D AlN

(Total for question = 8 marks)

Q21.

Dilute hydrochloric acid reacts with silver nitrate solution to form silver chloride and nitric acid.

(i) Complete the sentence by putting a cross () in the box next to your answer.

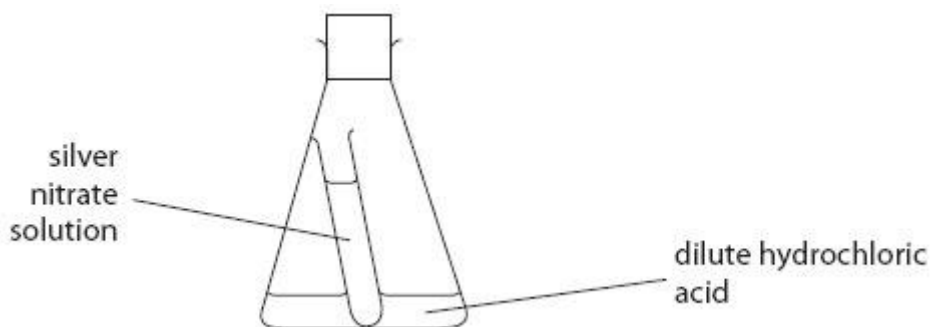
The reaction produces silver chloride as a precipitate.

In an equation this would be shown as

(1)

- A AgCl(aq)
- B AgCl(g)
- C AgCl(l)
- D AgCl(s)

(ii) This apparatus is used to investigate the mass of the reactants and the mass of products in this reaction.



The total mass of this apparatus was measured.

The flask was shaken to allow the silver nitrate solution and dilute hydrochloric acid to react.

After the reaction the total mass of the apparatus was measured again.

State how the total mass of the apparatus after the reaction will compare with the total mass of the apparatus before the reaction.

(1)

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(iii) Write the balanced equation for the reaction of silver nitrate solution, AgNO₃, with dilute hydrochloric acid to form silver chloride, AgCl, and nitric acid.

(2)

Q22.

Nitric acid reacts with magnesium carbonate to form a salt, water and a gas.

(i) State the name of the salt formed in this reaction.

(1)

.....

(ii) Which of these is the gas produced in this reaction?

Put a cross () in the box next to your answer.

(1)

- A carbon dioxide
- B hydrogen
- C oxygen
- D nitrogen

(Total for question = 2 marks)

Q23.

When a small piece of potassium is dropped into water, there is a vigorous reaction. Bubbles of gas are evolved and the solution formed is alkaline.

Write the balanced equation for this reaction.

(3)

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(Total for question = 3 marks)