AQA GCSE CHEMISTRY (HIGHER) · 8462

CHEMISTRY



EXAM QUESTION PACK

4.4.1 REACTIVITY OF METALS (PACK 2)

SCORE	PERCENTAGE
/171	%

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Q1.

Steels are used to make cars, bridges and knives.
The main element in steel is iron.

(a) Iron is extracted from an *ore* that contains about 60% iron oxide, Fe_2O_3

(i) What is the meaning of *ore*?

_____

_____

(1)

(ii) In a blast furnace, iron oxide reacts with carbon monoxide to produce iron.
The word equation for this reaction is:

iron oxide + carbon monoxide → iron + carbon dioxide

Complete and balance the chemical equation for this reaction.

Fe_2O_3 + ____ CO → _____ + _____

(2)

(iii) Name the type of reaction that produces a metal from its metal oxide.

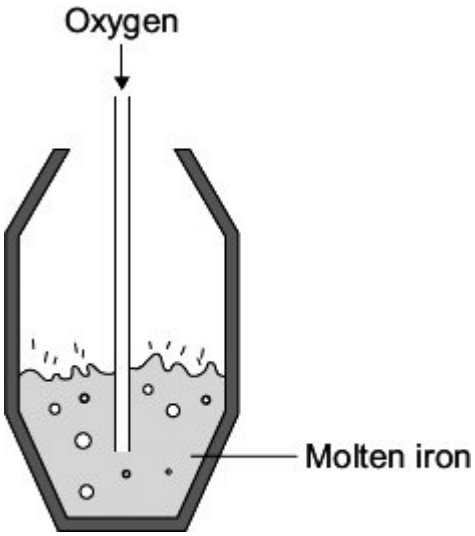
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(1)

(b) Steels are produced from molten iron in two stages:

Stage 1 blowing oxygen into molten iron from the blast furnace.

Stage 2 adding other metals to make different steels.



(i) In **Stage 1**, suggest how the oxygen removes most of the carbon from the molten iron.

_____

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_____

_____

_____

(2)

(ii) **Stage 2** produces different steels.

Suggest why different steels are needed.

_____

_____

(1)

(c) Old 5p and 10p coins in the UK were made from cupro-nickel.
Cupro-nickel is 75% copper and 25% nickel.

New 5p and 10p coins in the UK are now made from nickel-plated steel and not from cupro-nickel.

Explain why.

_____

_____

_____

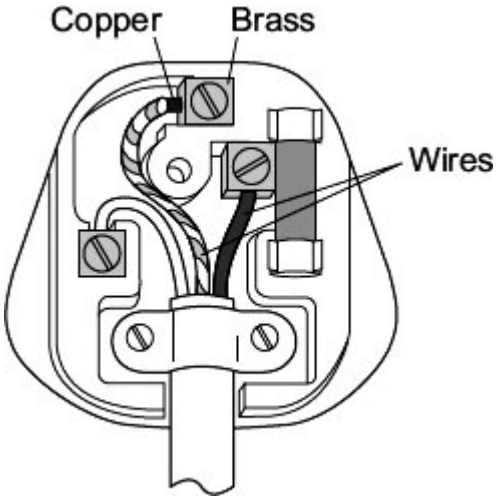
_____

(2)

(Total 9 marks)

Q2.

The diagram shows an electric plug.



(a) (i) Draw a ring around the correct answer to complete the sentence.

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Copper is used for the wires because it

conducts electricity.
conducts heat.
is shiny.

(1)

(ii) Brass is an *alloy* of copper and zinc.

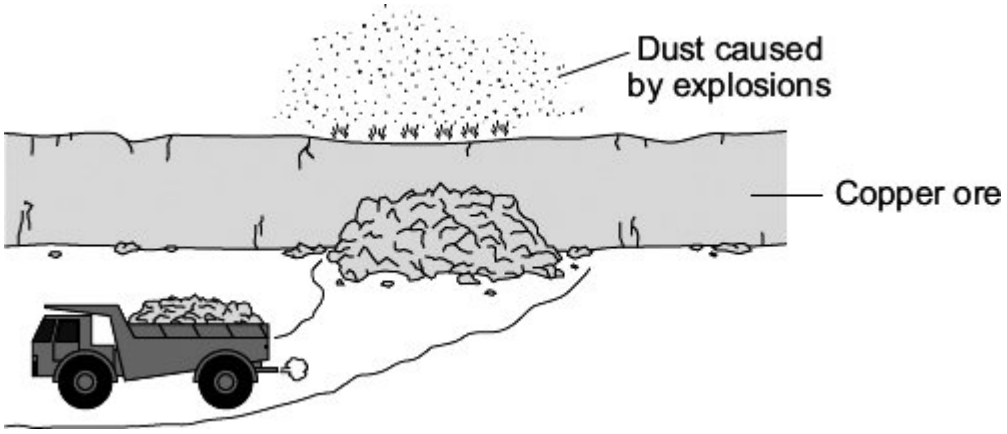
What is an *alloy*?

_____

_____

(1)

(b) Open-cast mines are used to obtain copper ore.



Suggest **two** reasons why people would **not** like to live near an open-cast mine.

1. _____

_____

2. _____

_____

(2)

(Total 4 marks)

Q3.

The flow diagram shows the main stages used to extract a metal from its ore.

mining the ore → purifying the ore → extracting the metal

The table shows some information about three metals.

Metal	Metal ore	Purified ore	% of metal	% of metal in the

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			in the ore	Earth's crust
aluminium	bauxite	aluminium oxide, Al_2O_3	28.0	8.0
copper	chalcocite	copper sulfide, Cu_2S	0.5	0.001
iron	haematite	iron oxide, Fe_2O_3	29.0	5.0

(a) Use the information in the table and your knowledge and understanding to help you to answer the questions.

(i) Suggest why purifying the copper ore produces large quantities of waste.

_____

_____

_____

(1)

(ii) Suggest why the annual world production of iron is forty times greater than that of aluminium.

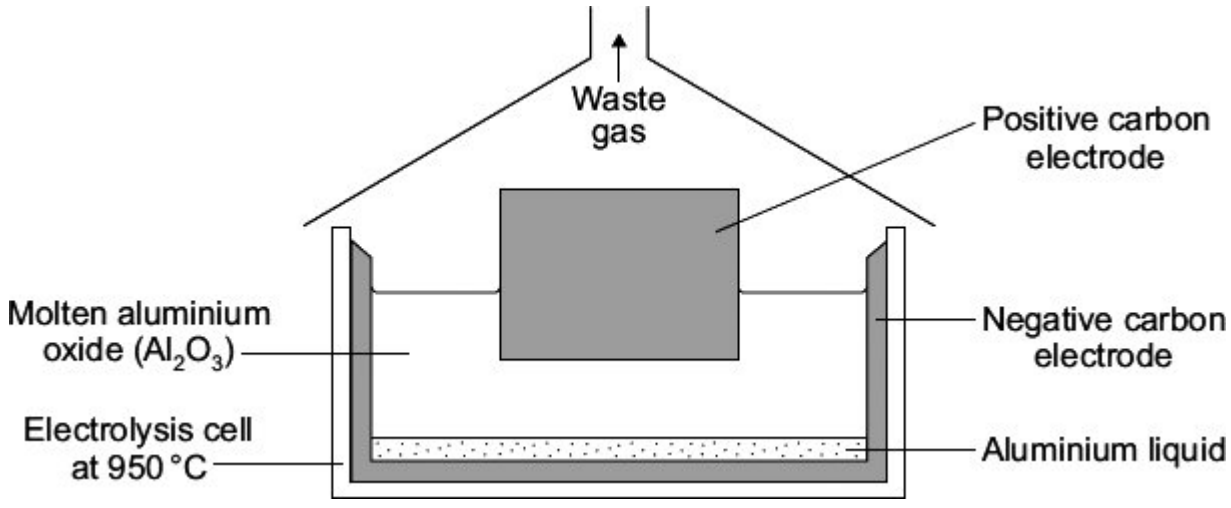
_____

_____

_____

(1)

(b) Aluminium is used for drinks cans.
Aluminium is extracted from its purified ore by electrolysis.



(i) Suggest why the aluminium produced in the electrolysis cell is a liquid.

_____

_____

(1)

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(ii) In this electrolysis, aluminium and oxygen gas are produced from the aluminium oxide.

Use the information in the diagram to suggest why most of the waste gas is carbon dioxide and not oxygen.

_____

_____

_____

_____

(2)

(iii) Aluminium is the most abundant metal in the Earth's crust.

Suggest **two** reasons why we should recycle aluminium drinks cans.

1. _____

_____

2. _____

_____

(2)

(Total 7 marks)

Q4.

Titanium is used for replacement hip joints because it has a low density, is strong and does not corrode.
Titanium is extracted from titanium dioxide (TiO_2) in three stages.

(a) **Stage 1**
Titanium dioxide is converted into titanium chloride ($TiCl_4$) because the metal cannot be extracted from its oxide by *reduction* with carbon.

(i) What does *reduction* mean?

_____

_____

(1)

(ii) Balance the chemical equation for the conversion of titanium dioxide to titanium chloride.

$$TiO_2 \quad + \quad Cl_2 \quad + \quad C \quad \rightarrow \quad TiCl_4 \quad + \quad CO_2$$

(1)

(iii) Chemical equations are always balanced. Explain why.

_____

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_____

_____

(1)

(b) **Stage 2**
Titanium is extracted from the titanium chloride by reacting it with sodium at 1000 °C in a reactor.
The only other substance in the reactor is argon gas.

$TiCl_4$ + 4Na → Ti + 4NaCl

(i) What does this tell you about the reactivity of sodium compared with titanium?

_____

_____

(1)

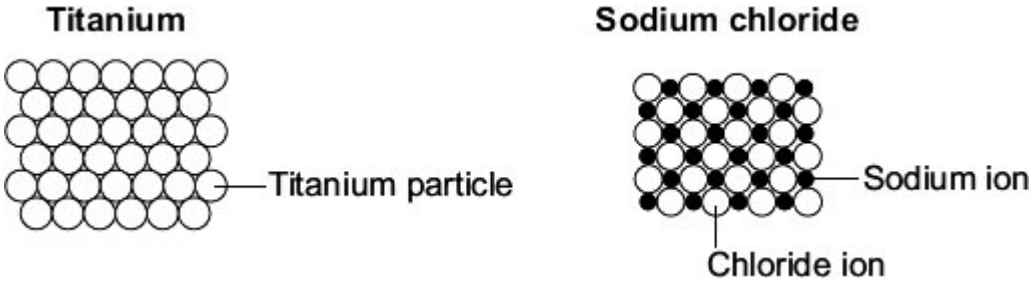
(ii) Suggest why the reactor contains argon and **not** air.

_____

_____

(1)

(c) **Stage 3**
After **Stage 2** the titanium is separated from the products by washing out the sodium chloride with water.
The diagrams show sections through the lattice of titanium metal and the lattice of sodium chloride.



How do the diagrams show that:

(i) titanium is an element

_____

_____

(1)

(ii) sodium chloride is a compound?

_____

_____

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_____

_____

(2)

(Total 8 marks)

Q5.

An ore contains zinc carbonate ($ZnCO_3$).

(a) Complete the table to show the number of atoms of each element in the formula of zinc carbonate.

Zinc has been done for you.

Element	Number of atoms in the formula $ZnCO_3$
Zinc, Zn	1
Carbon, C	
Oxygen, O	

(2)

(b) Draw a ring around the correct answer to complete the sentence and the word equation.

(i) Zinc carbonate decomposes in a similar way to calcium carbonate

when [water is added. / cooled. / heated.]

(1)

(ii) zinc carbonate ⟶ zinc oxide + [carbon dioxide / hydrogen / oxygen]

(1)

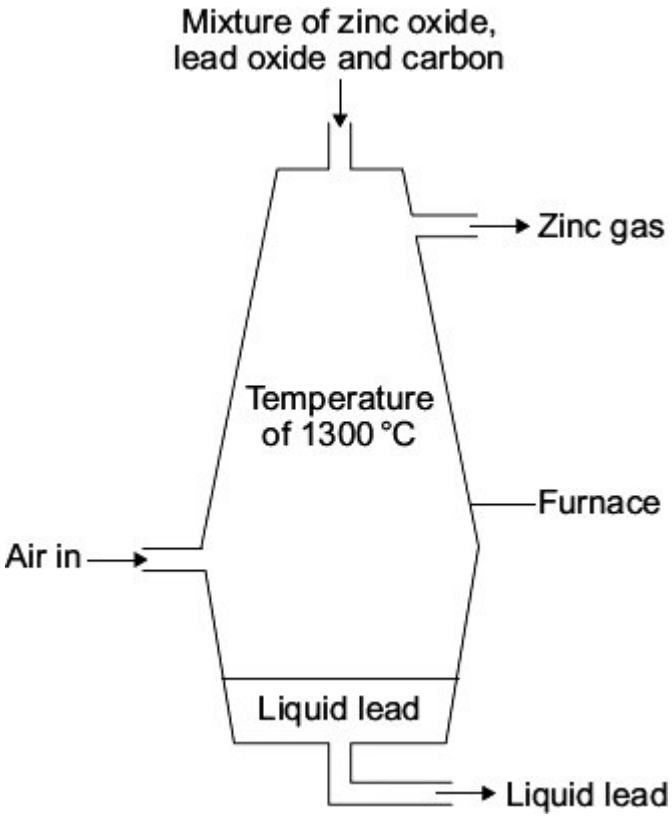
(c) Another ore contains a mixture of zinc carbonate and lead carbonate.

The metals zinc and lead are produced from this ore in two stages:

Stage 1 decomposing the carbonates to produce a mixture of zinc oxide and lead oxide.

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Stage 2 mixing the oxides with carbon and heating in a furnace.



Some of the reactions in the furnace are:

zinc oxide + carbon → zinc + carbon dioxide

lead oxide + carbon → lead + carbon dioxide

carbon + oxygen → carbon dioxide

Use the information given to help you to answer these questions.

(i) Draw a ring around the correct answer to complete the sentence.

The reaction between carbon and oxygen that heats the furnace is called

combustion.
decomposition.
evaporation.

(1)

(ii) Tick (✓) **one** reason why carbon reacts with zinc oxide to produce zinc.

Reason	**Tick (✓)**

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carbon is less reactive than zinc	
carbon is more reactive than zinc	
carbon is similar in reactivity to zinc	

(1)

(iii) In the furnace zinc is a gas but lead is a liquid.

Suggest why.

_____

_____

_____

_____

(2)

(Total 8 marks)

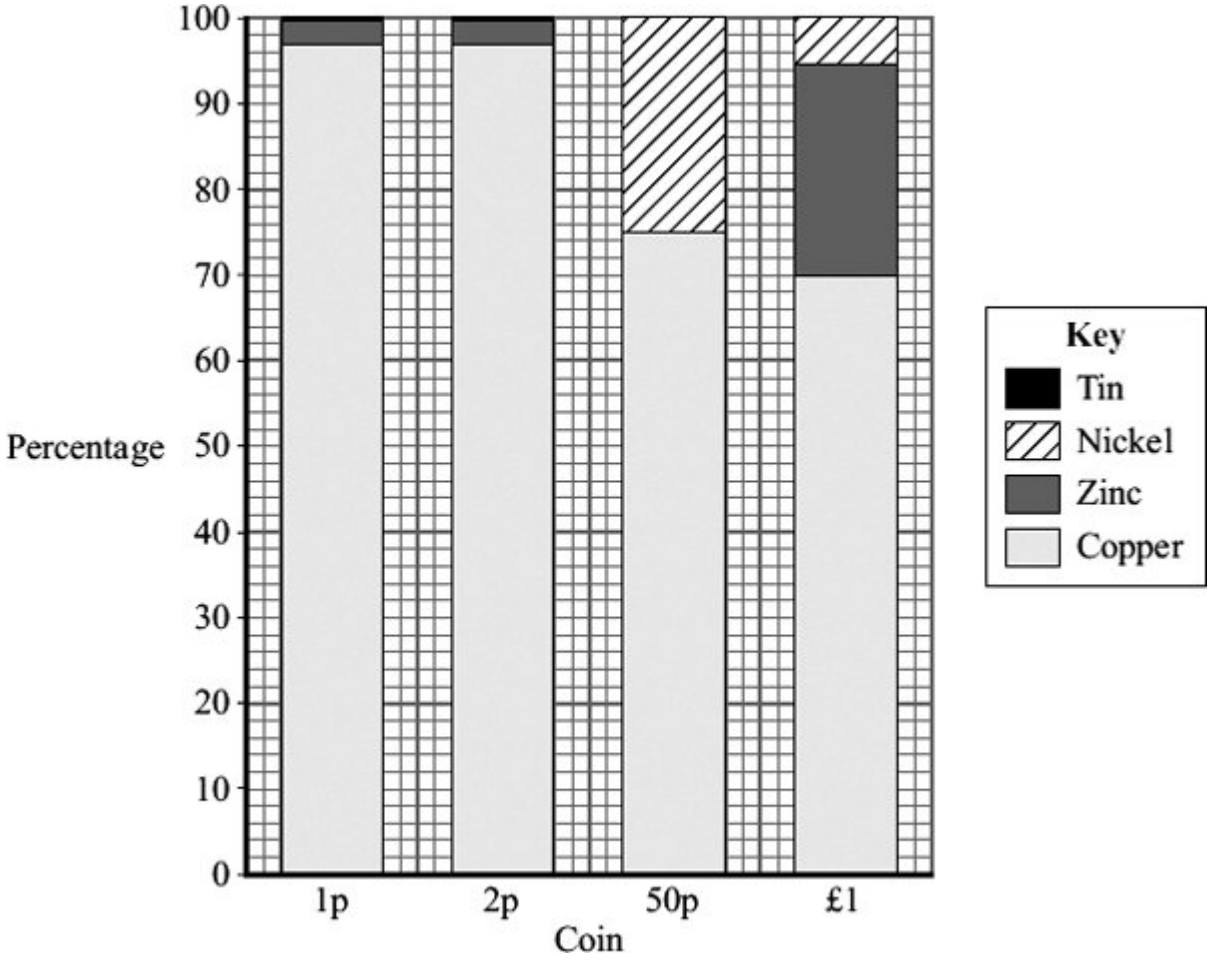
Q6.

This is the headline from a newspaper:



(a) The bar chart shows the percentages of metals in UK coins in 1991.

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Use the bar chart to answer these questions.

(i) Which metal is in all of these coins?

_____

(1)

(ii) Which coin does **not** contain zinc?

_____

(1)

(iii) What is the percentage of nickel in a 50p coin?

Percentage = _____ %

(1)

(iv) Draw a ring around the correct metal to complete the sentence.

Pure copper is too soft to be used for 1p and 2p coins.

Copper is mixed with zinc and | nickel / tin / iron | for 1p and 2p coins.

(1)

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(b) The value of the metal in 2p coins which were made in 1991 is now 3.3p.

(i) Suggest why a 2p coin made in 1991 is worth 3.3p.

_____

_____

_____

(1)

(ii) Suggest why copper-plated steel is now used for 1p and 2p coins.

_____

_____

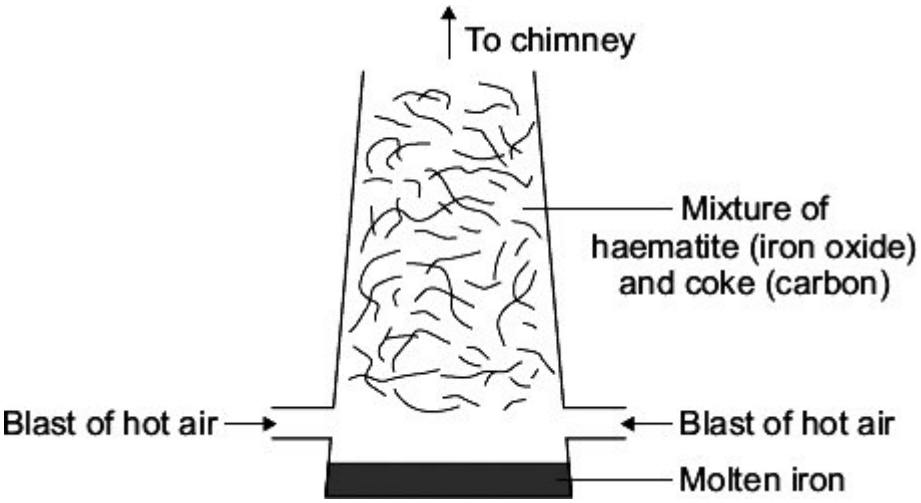
_____

(1)

(Total 6 marks)

Q7.

Iron is produced by reacting a mixture of haematite and coke in a blast furnace.
Haematite is an ore of iron containing iron oxide (Fe_2O_3).
Coke is made from coal and is almost pure carbon.



(a) (i) The coke burns in air. This reaction heats the furnace to above 1300 °C.

Complete the chemical equation for carbon reacting with oxygen to form carbon dioxide.

_____ + O_2 → CO_2

(1)

(ii) Carbon monoxide is also formed in the furnace. Carbon monoxide reacts with iron oxide to produce iron and carbon dioxide.

iron oxide + carbon monoxide → iron + carbon dioxide

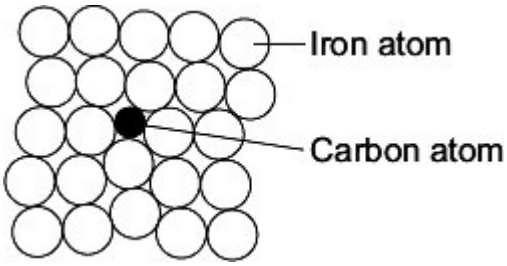
Complete and balance the chemical equation for the production of iron.

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Fe_2O_3 + 3CO → _____ + _____

(2)

(iii) Iron from a blast furnace is called cast iron and contains about 4% carbon.



Why is pure iron softer than cast iron?

_____

_____

(1)

(b) Steel is made by reducing the percentage of carbon in cast iron and then adding different metals to form the type of steel required.

In the UK we use about 1.8 billion steel cans every year but only 30% of these are recycled. Recycling reduces waste. Producing steel from recycled cans requires only 25% of the energy needed to make steel from iron ore.

Give **three** environmental benefits of recycling a higher percentage of used steel cans.

1. _____

_____

2. _____

_____

3. _____

_____

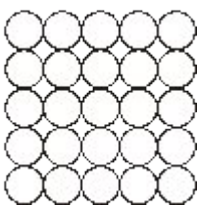
(3)

(Total 7 marks)

Q8.

Iron is the main structural metal used in the world.

(a) The diagram represents the particles in iron, Fe.



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Draw a ring around the correct word in the box to complete the sentence.

Iron is described as an element because all the

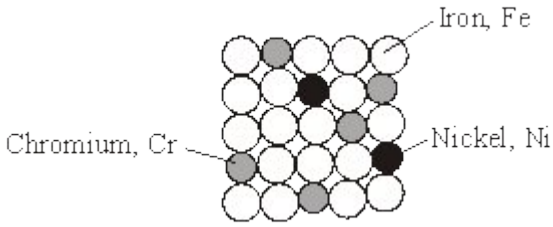
atoms
compounds
metals

are the same.

(1)

(b) Stainless steel is mostly iron.

The diagram represents the particles in stainless steel.



Use the correct words from the box to complete the sentences about alloys.

metal	**mixture**	**molecule**	**polymer**	**smart**	**structure**

Stainless steel is an alloy because it is a _____ of iron, chromium and nickel.

An alloy is made up of more than one type of _____ .

Stainless steel alloys are harder than iron because the different sized atoms added change the _____ .

An alloy that can return to its original shape after being deformed is called a _____ alloy.

(4)

(c) In the UK, we use about 1.8 billion steel cans every year but only 25% are recycled. Used steel cans are worth about £100 per tonne.

Recycling saves raw materials and reduces waste that would end up in landfill. Producing steel by recycling used cans saves 75% of the energy that would be needed to produce steel from iron ore. This also reduces carbon dioxide emissions.

(i) Give **two** reasons, from the information above, to explain why recycling used steel cans is a good idea.

1. _____

_____

2. _____

_____

(2)

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(ii) Suggest how the local council could increase the percentage of used steel cans that are recycled.

_____

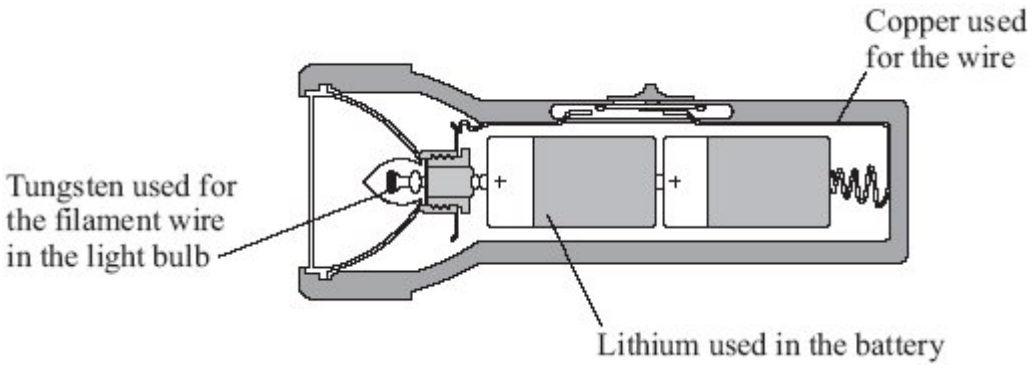
_____

(1)

(Total 8 marks)

Q9.

The diagram shows a circuit that is used in a torch. Electrons flow through this circuit.

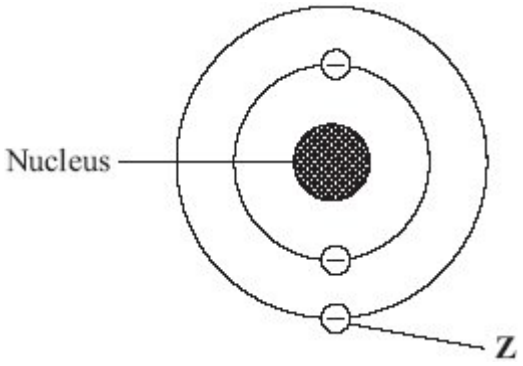


(a) Why is copper used for the wire?

_____

(1)

(b) The diagram shows the structure of an atom of lithium.



Name the particle labelled **Z**.

_____

(1)

(c) The table shows some properties of the metals used in the electrical circuit.

Metal	Melting point in °C	Boiling point in °C	Reaction with oxygen
Copper	1083	2582	Reacts **slowly** to form a thin oxide layer on

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			surface
Lithium	179	1317	Reacts **rapidly** to form oxide
Tungsten	3370	5930	Reacts **only** when very hot to form oxide

(i) Use information from the table to suggest the order of reactivity for copper, lithium and tungsten.

most reactive _____

_____

least reactive _____

(2)

(ii) The filament wire glows because it gets very hot.

Use information from the table to suggest **one** reason why tungsten is used for the filament wire in the light bulb.

_____

_____

(1)

(d) The gas used in the light bulb is argon.

Draw a ring around the correct word in the box to complete the sentence.

Argon is used in the light bulb because it is

dense.
solid.
unreactive.

.

(1)

(Total 6 marks)

Q10.

(a) PEX is a material that is used as an alternative to copper for hot water pipes.
PEX is made from poly(ethene).

(i) Describe how ethene forms poly(ethene).

_____

_____

_____

_____

(2)

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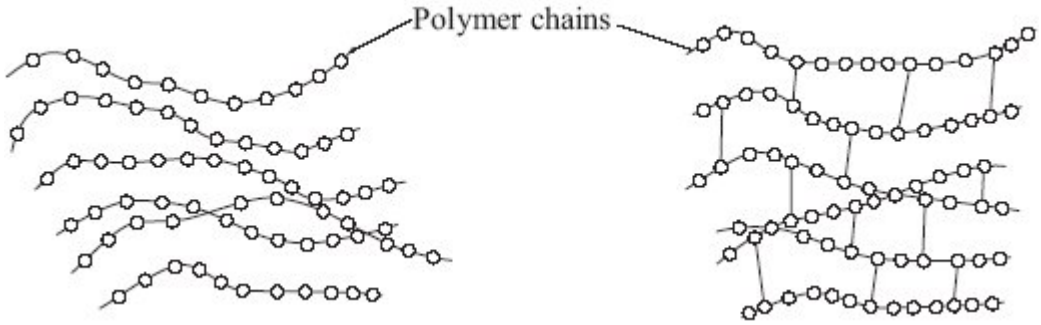
(ii) PEX is a shape memory polymer. What property does a shape memory polymer have?

_____

_____

(1)

(iii) The simplified structures of poly(ethene) and PEX are shown.



Poly(ethene) **PEX**

Poly(ethene) is a thermoplastic that softens easily when heated.

Suggest and explain how the structure of PEX changes this property.

_____

_____

_____

_____

_____

(3)

(b) Copper was considered to be the most suitable material to use for hot water pipes. PEX is now used as an alternative material for hot water pipes.

Copper is extracted from its ore by a series of processes.

1 The low-grade ore is powdered and concentrated.
2 Smelting is carried out in an oxygen flash furnace. This furnace is heated to 1100 °C using a hydrocarbon fuel. The copper ore is blown into the furnace with air, producing impure, molten copper.
3 Oxygen is blown into the impure, molten copper to remove any sulfur. The copper is cast into rectangular slabs.
4 The final purification of copper is done by electrolysis.

PEX is made from crude oil by a series of processes.

1 Fractional distillation
2 Cracking
3 Polymerisation
4 Conversion of poly(ethene) into PEX

Suggest the possible environmental advantages of using PEX instead of copper for hot water pipes.

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_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 10 marks)

Q11.

Metals and their alloys have many uses.

(a) Dentists use a smart alloy to make braces that gently push teeth into the right position.

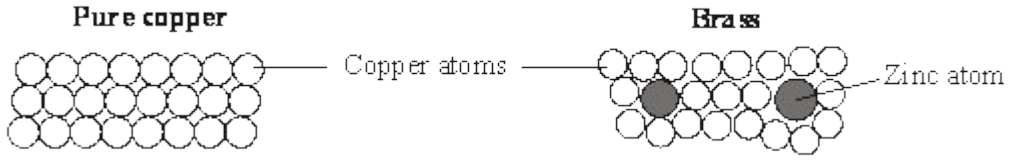
What is meant by a *smart alloy*?

_____

_____

(1)

(b) Pure copper is made up of layers of copper atoms. Brass is an *alloy* of copper and zinc.



Why are the physical properties of brass different from the physical properties of pure copper?

_____

_____

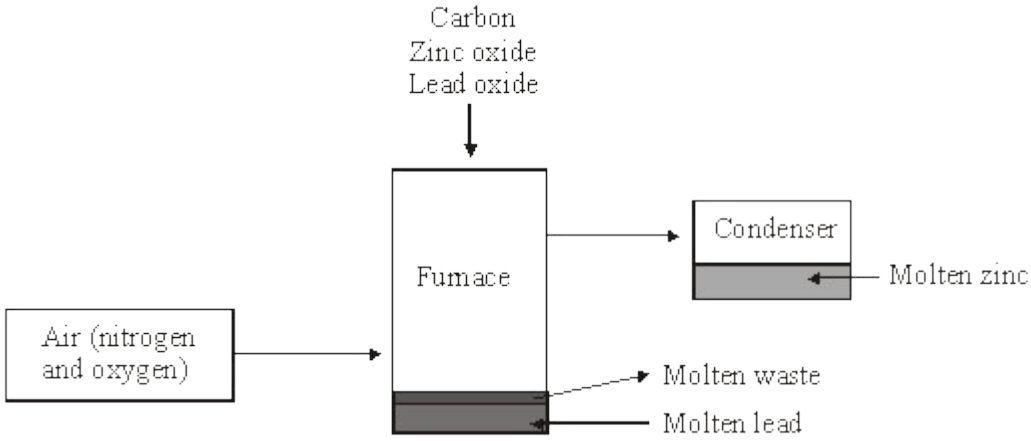
_____

_____

(2)

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(c) Nearly all zinc is obtained from ores that also contain lead. The metals zinc and lead can be extracted by reducing their oxides using carbon.



(i) Choose **one** element from the box below to complete the sentence about the reduction of zinc oxide.

lead	**nitrogen**	**oxygen**

Zinc oxide is reduced by carbon, which takes away _____ to leave zinc metal.

(1)

(ii) The melting points and boiling points of lead and zinc are given in the table.

Metal	**Lead**	**Zinc**
Melting point in °C	328	420
Boiling point in °C	1740	907

The furnace operates at a temperature of 1200 °C.

Suggest how the lead metal and zinc metal are separated in the furnace.

_____

_____

_____

_____

(2)

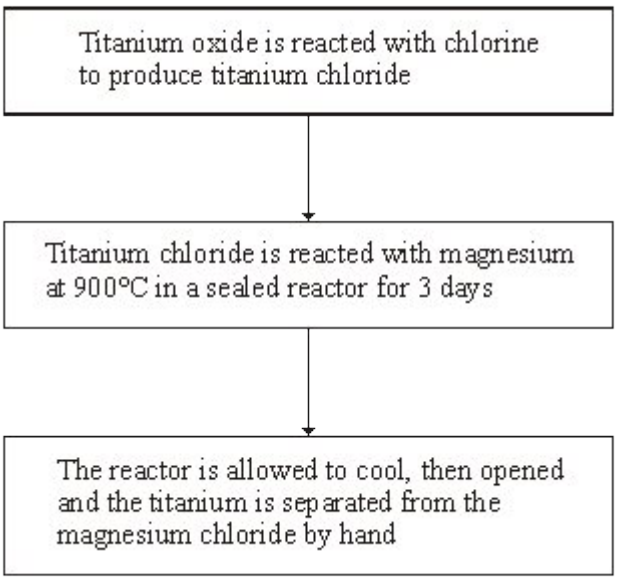
(Total 6 marks)

Q12.

Titanium is used in aircraft, ships and hip replacement joints. Titanium is as strong as steel but 45% lighter, and is more resistant to acids and alkalis.

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Most titanium is produced from its ore, rutile (titanium oxide), by a batch process that takes up to 17 days.



Titanium reactors produce about 1 tonne of the metal per day.
Iron blast furnaces produce about 20 000 tonnes of the metal per hour.

(a) Give **one** property of titanium that makes it more useful than steel for hip replacement joints.

_____

(1)

(b) In the reactor magnesium is used to produce titanium. If carbon were used instead of magnesium, no titanium would be produced.

What does this tell you about the relative reactivities of carbon, magnesium and titanium?

_____

_____

_____

_____

(2)

(c) The use of titanium is limited because it is expensive.

Explain why titanium costs more than steel.

_____

_____

_____

_____

_____

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_____

(3)

(Total 6 marks)

Q13.

Many everyday items are made from iron.

(a) Haematite is an *ore* of iron. Haematite contains iron oxide, Fe_2O_3.

(i) What is the meaning of the term *ore*?

_____

_____

(1)

(ii) Iron can be produced by reacting iron oxide with carbon in a blast furnace.

What type of reaction produces the iron?

_____

_____

(1)

(iii) The word equation for this reaction is:

iron oxide + carbon → iron + carbon dioxide

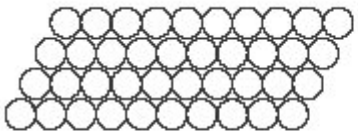
Complete and balance the symbol equation for this reaction.

___Fe_2O_3 + ___C → _____ + _____

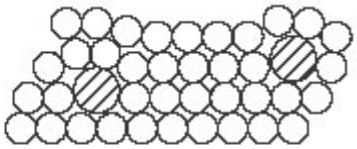
(2)

(b) Pure iron is relatively soft and not very strong.

The iron from the blast furnace is very hard and brittle. It contains about 4% carbon and is used as cast iron.



Pure iron



Cast iron

Explain the differences in the properties of pure iron and cast iron by referring to the diagrams.

_____

_____

_____

_____

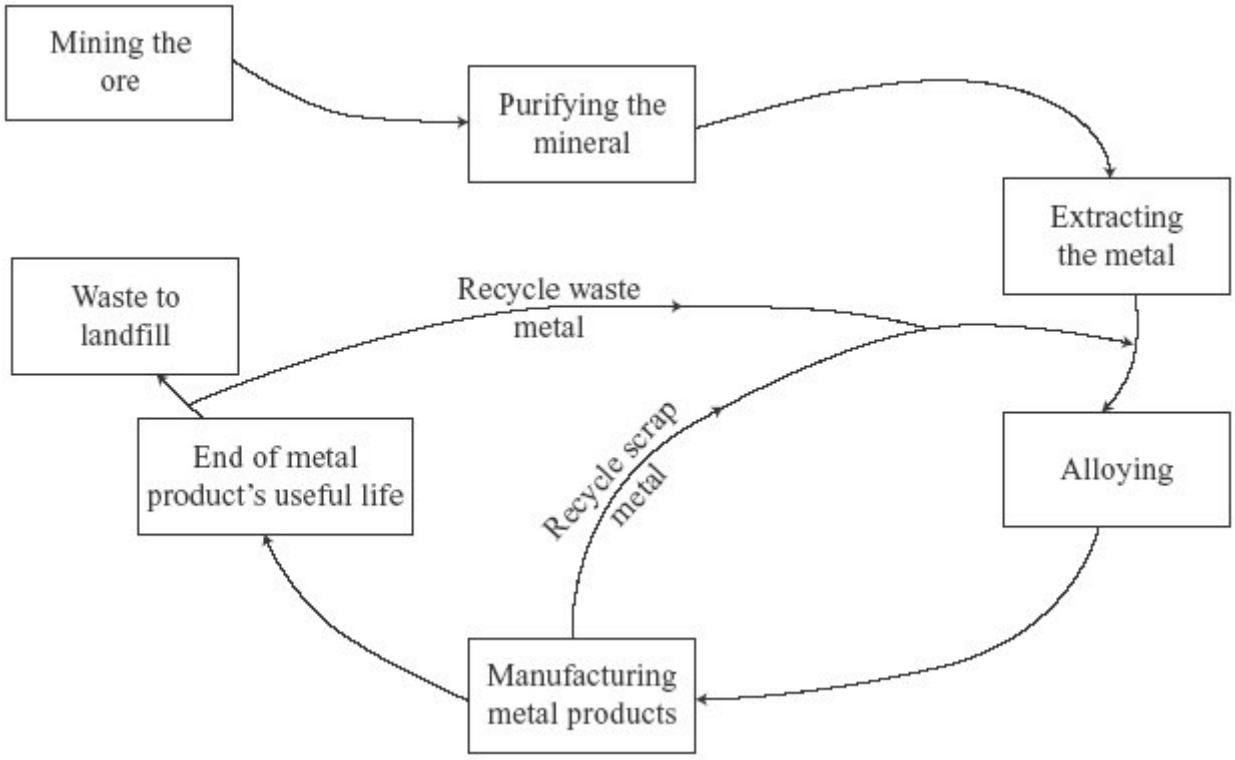
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_____

_____

(3)

(c) The diagram shows the way in which iron is extracted, used and recycled.



Explain why the recycling of iron is necessary for sustainable development.

_____

_____

_____

_____

_____

_____

(3)

(Total 10 marks)

Q14.

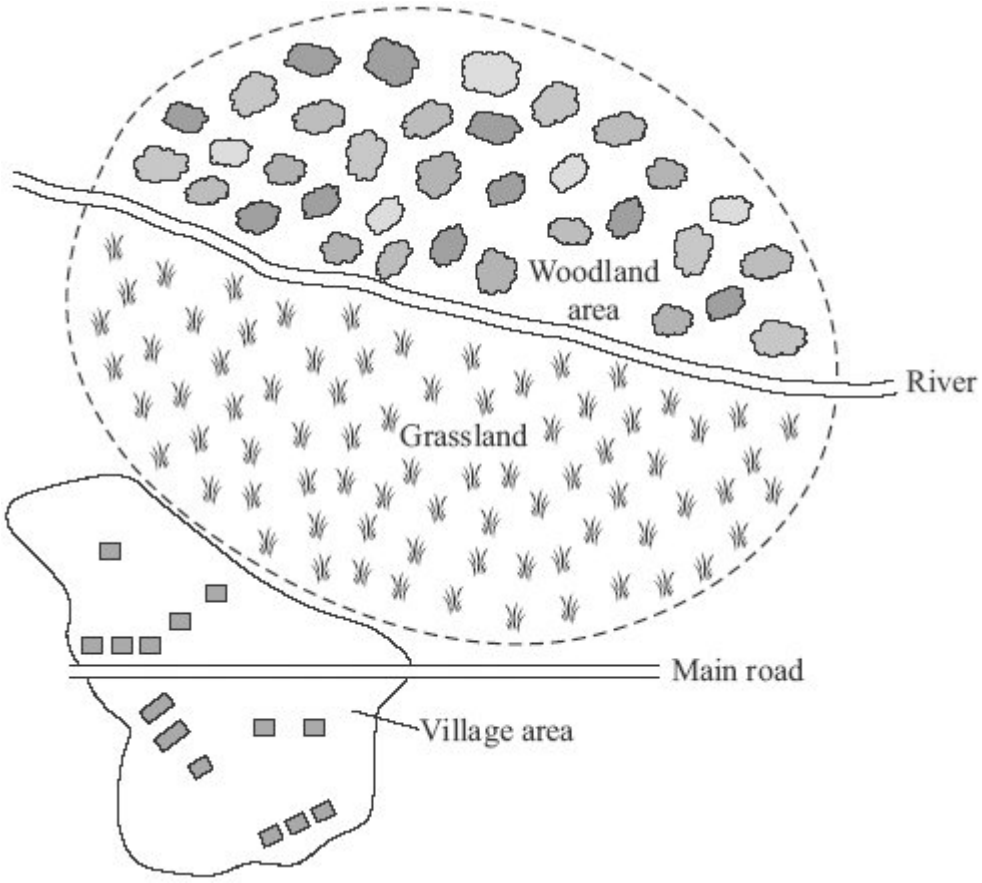
Iron ore is the main source of iron.

(a) This was the headline in a newspaper.

'Village protests against quarry'

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The dotted line (----) on the map is drawn around the area from which a company wants to quarry iron ore.



(i) Give **one** reason that the company could give for the need to quarry the iron ore.

_____

_____

(1)

(ii) The people who live in the village do not want the quarry because it would decrease the value of their homes.

Suggest **two** other reasons why the villagers do not want the quarry.

1. _____

_____

2. _____

_____

(2)

(b) Iron ore contains the compound iron oxide, $Fe_{2=}O_3$.

(i) Iron is extracted from its oxide in the blast furnace.

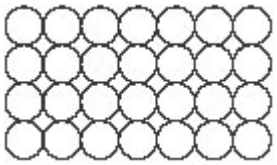
Complete the word equation for the extraction of iron.

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iron oxide + _____ → iron + carbon dioxide

(1)

(ii) This diagram represents pure iron.



Use the diagram to explain why pure iron is described as an element.

_____

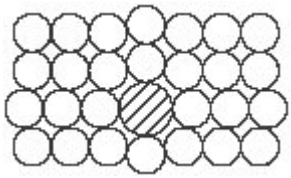
_____

_____

_____

(2)

(iii) Pure iron is relatively soft. The iron from the blast furnace is hard and brittle. The diagram below represents iron from the blast furnace.



Use the diagram to explain why iron from the blast furnace is hard and brittle.

_____

_____

_____

_____

(2)

(Total 8 marks)

Q15.

Copper is a widely used metal. The main ore of copper contains copper sulfide. Copper can be extracted from copper sulfide in a three stage process.

$$Cu_2S + ____O_2 \rightarrow _____CuO + SO_2$$

(1)

(ii) Explain why there would be an environmental problem if the gas from this reaction were allowed to escape into the atmosphere.

_____

_____

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_____

_____

(2)

(b) In the second stage copper oxide, CuO, is reduced using carbon.

Describe and explain what happens during this reaction.

_____

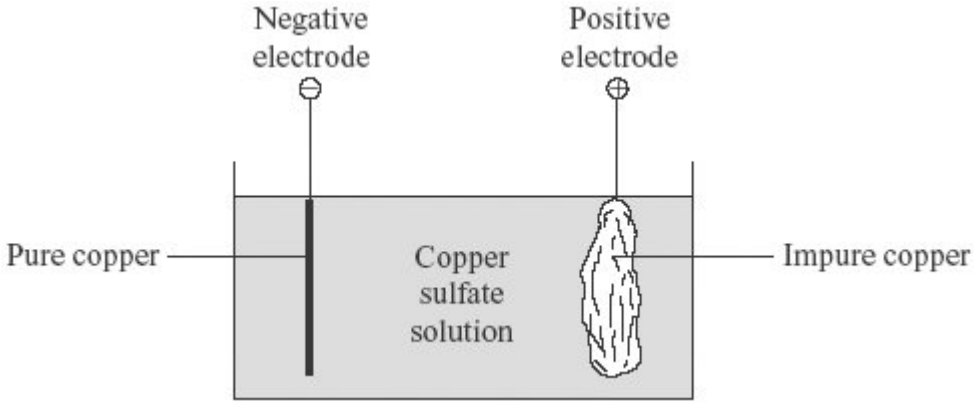
_____

_____

_____

(2)

(c) During the third stage the copper can be purified as shown in the diagram.



(i) What is the name of the type of process used for this purification?

_____

(1)

(ii) Give **one** use of purified copper.

_____

(1)

(d) Copper-rich ores are running out.

New ways of extracting copper from low grade ores are being researched.

Recycling of copper may be better than extracting copper from its ores.

Explain why.

_____

_____

_____

_____

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_____

_____

(3)

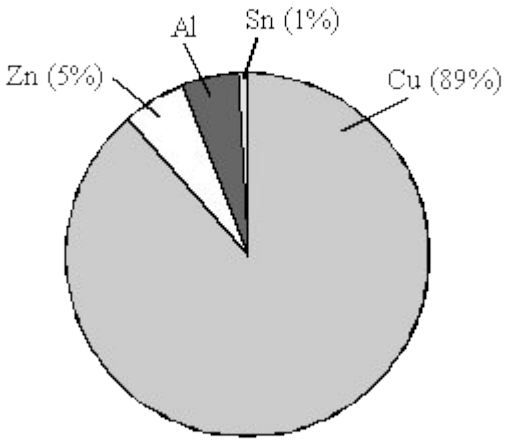
(Total 10 marks)

Q16.

The 50 Eurocent coin is made from an alloy called ‘Nordic Gold’.



The pie chart shows the percentage by mass of each metal in ‘Nordic Gold’.



(a) (i) Calculate the percentage of aluminium, Al, in the coin.

_____

(1)

(ii) The 50 Eurocent coin has a mass of 7 grams.
Calculate the mass of zinc, Zn, in this coin.

_____

_____

Mass of zinc = _____ g

(2)

(b) Zinc is extracted by removing oxygen from zinc oxide.

(i) What name is given to a reaction in which oxygen is removed from a substance?

_____

(1)

(ii) Explain how oxygen can be removed from zinc oxide to make zinc. Use the reactivity series on the Data Sheet to help you

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_____

_____

_____

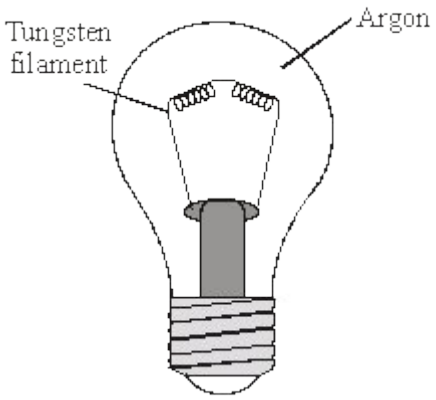
_____

(2)

(Total 6 marks)

Q17.

The diagram shows an electric light bulb.



When electricity is passed through the tungsten filament it gets very hot and gives out light.

(a) What reaction would take place if the hot tungsten was surrounded by air?

_____

_____

_____

(1)

(b) State why argon is used in the light bulb. Explain your answer in terms of the electronic structure of an argon atom.

_____

_____

_____

_____

_____

_____

(3)

(Total 4 marks)

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Q18.

The table gives information about some metals.

Name of the metal	Cost of one tonne of the metal in December 2003 (£)	Percentage of the metal in the crust of the earth (%)
Aluminium	883	8.2
Platinum	16720000	0.0000001
Iron	216	4.1
Gold	8236800	0.0000001

(a) Use information in the table to suggest why gold and platinum are very expensive metals.

_____

_____

(1)

(b) Aluminium and iron are made by *reduction* of their ores.

(i) Name the element that is removed from the ores when they are *reduced.*

_____

(1)

(ii) Use the reactivity series on the Data Sheet to suggest a metal that would reduce aluminium ore.

_____

(1)

(c) Aluminium is made by the reduction of molten aluminium ore, using a very large amount of electricity.

(i) How is iron ore reduced in a blast furnace to make iron?

_____

_____

_____

_____

(2)

(ii) Suggest why aluminium is more expensive than iron.

_____

_____

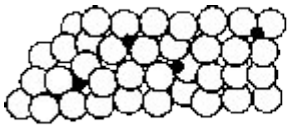
(1)

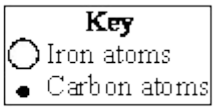
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(Total 6 marks)

Q19.

The diagram shows the arrangement of atoms in an *alloy.*





(a) What is meant by an *alloy?*

_____

_____

(2)

(b) Name the alloy represented in the diagram.

_____

(1)

(c) Give **one** advantage of using this alloy instead of pure iron.

_____

_____

(1)

(d) Which elements are used to make brass?

_____

(1)

(Total 5 marks)

Q20.

The word equation below shows a reaction used in an industrial process.

chromium oxide + aluminium → chromium + aluminium oxide

The reaction is highly exothermic.

(a) What is an exothermic reaction?

_____

_____

(2)

(b) Name the products of this reaction.

_____

(1)

(c) In the reaction one substance is reduced.

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(i) Name the substance which is reduced.

_____

(1)

(ii) What happens to the substance when it is reduced?

_____

_____

(1)

(Total 5 marks)

Q21.

One step in the manufacture of lead is the reduction of lead oxide with carbon. Lead and carbon dioxide are the products of this reaction.

(a) Write a word equation for this reaction.

_____

(1)

(b) What is meant by "reduction"?

_____

(1)

(Total 2 marks)

Q22.

Use the Reactivity Series of Metals on the Data Sheet to help you to answer this question.

The table gives information about the extraction of some metals.

Metal	Date of discovery	Main source	Main extraction method
Gold	Known to ancient civilisations	In the Earth as the metal itself	Physically separating it from the rocks it is mixed with
Zinc	1500	Zinc carbonate	Reduction by carbon
Sodium	1807	Sodium chloride	Electrolysis

(a) Explain why gold is found mainly as the metal itself in the Earth.

_____

_____

(1)

(b) One of the reactions involved in producing zinc is represented by this equation.

$ZnO + C \rightarrow Zn + CO$

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Explain why carbon can be used to extract zinc.

_____

_____

(1)

(c) Sodium is one of the most abundant metals on Earth.

Explain, as fully as you can, why sodium was not extracted until 1807.

_____

_____

_____

_____

(2)

(Total 4 marks)

Q23.

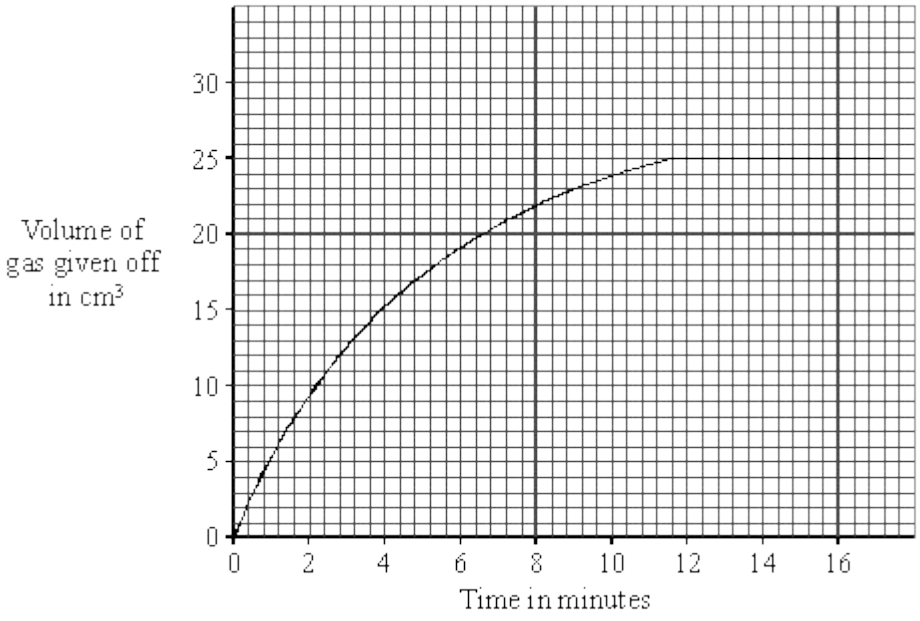
Zinc powder normally reacts slowly with hydrochloric acid.

(a) Balance the symbol equation for the reaction.

$Zn + HCl \rightarrow ZnC1_2 + H_2$

(1)

The graph shows the results from a reaction of 1.0 g of zinc powder with 20 cm^3 of dilute hydrochloric acid. It gives off a gas and forms zinc chloride, $ZnCl_2$. Some unreacted zinc is left at the end.



(b) Copper powder is a good catalyst for the reaction of zinc with hydrochloric acid.

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(i) A mixture of 10 cm^3 of the same dilute hydrochloric acid and 1.0 g of copper powder was added to 1.0 g of zinc powder. What is the maximum volume of gas which could be given off?

_____ cm^3

(1)

(ii) Draw a graph, on the axes above, for an experiment where 20 cm^3 of the same dilute hydrochloric acid was added to 1.0 g of copper powder mixed with 1.0 g of zinc powder.

(2)

(iii) Give **two** other ways the reaction described in part (i) could be made to go faster.

1. _____

2. _____

(2)

(c) Copper powder can be formed by adding copper sulphate solution to the mixture of zinc powder and acid.

(i) Why does zinc react with copper sulphate solution to produce copper?

_____

_____

(1)

(ii) Write the word equation for the reaction.

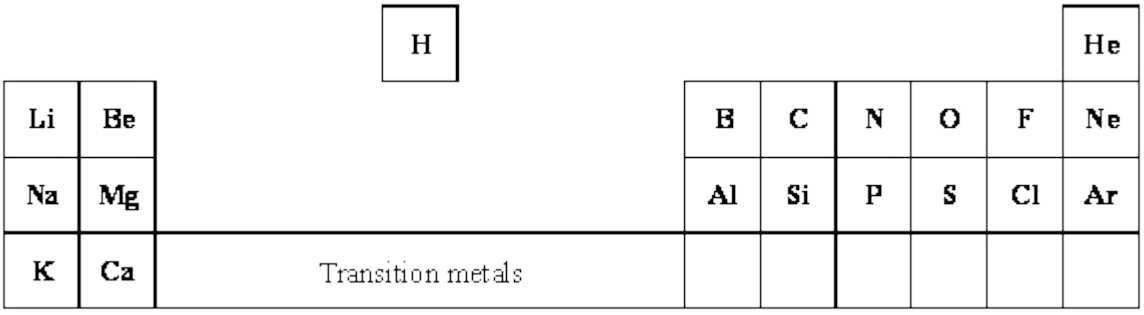
_____

(1)

(Total 8 marks)

Q24.

Part of the Periodic Table showing the symbols for the first twenty elements is given below.



(a) Draw diagrams showing the arrangement of electrons (electronic structures) in:

(i) an aluminium atom;

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(ii) a chlorine atom.

(2)

(b) (i) Use electronic structures to help you show why the formula of sodium oxide is Na_2O.

(3)

(ii) State why the formation of sodium ions is classified as an oxidation.

_____

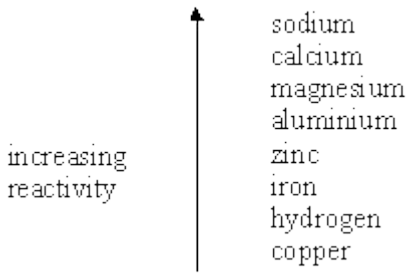
_____

(1)

(Total 6 marks)

Q25.

Part of a reactivity series is:



(a) Carbon is used in blast furnaces to obtain iron and zinc from their oxides, but electrolysis has to be used to obtain aluminium from its oxide.

Draw an arrow on the reactivity series above to show where carbon fits into the series.

(1)

(b) Predict the method of extraction used to obtain calcium from its ore and explain your answer.

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_____

_____

_____

(2)

(c) The formula for zinc oxide is ZnO. Write a balanced equation for the extraction of zinc in the blast furnace.

_____

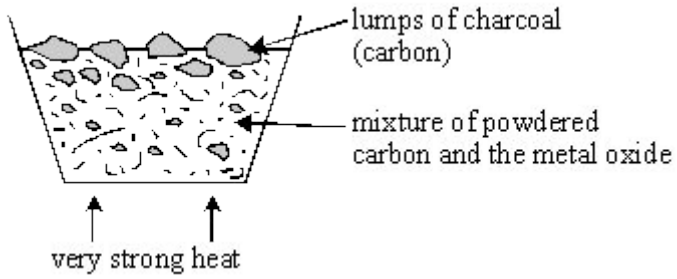
(2)

(Total 5 marks)

Q26.

A student was trying to extract the metals from lead oxide and aluminium oxide.

She heated each oxide with carbon in a fume cupboard as shown below.



She was able to extract lead from lead oxide but not aluminium from aluminium oxide.

(i) Explain the results of these experiments.

_____

_____

_____

_____

_____

(ii) Complete this word equation for the reaction between lead oxide and carbon.

lead oxide + carbon → _____ + _____

(Total 5 marks)

Q27.

Choose gases from this list to complete the word equations below.

carbon dioxide hydrogen nitrogen

oxygen sulphur dioxide

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(a) sodium + water → sodium hydroxide + _____ .

(1)

(b) magnesium + _____→ magnesium oxide.

(1)

(Total 2 marks)

Q28.

Here is the word equation for a chemical reaction.

magnesium + zinc oxide → magnesium oxide + zinc

Write down everything that the word equation tells you about the reaction.

_____

_____

_____

_____

(Total 4 marks)

Q29.

Cassiterite is an ore of the metal tin.

(a) What is an ore?

_____

_____

(2)

(b) Some metals are obtained by removing oxygen from the metal oxide.

What name do we give to this chemical reaction?

_____

(1)

(c) Name **one** metal which must be extracted from its melted ore by electrolysis rather than by using carbon.

_____

(1)

(Total 4 marks)

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