PEARSON EDEXCEL GCSE CHEMISTRY · 1CH0

CHEMISTRY



EXAM QUESTION PACK

TOPIC 1: KEY CONCEPTS IN CHEMISTRY (PACK 6)

SCORE	PERCENTAGE
/69	%

STEMUP

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Q1.

The periodic table is very useful to chemists.

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

The periodic table is a table of

(1)

- ☒ **A** mixtures
- ☒ **B** elements
- ☒ **C** compounds
- ☒ **D** solutions

Q2.

The periodic table is very useful to chemists.

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

The periodic table is a table of

(1)

- ☒ **A** mixtures
- ☒ **B** elements
- ☒ **C** compounds
- ☒ **D** solutions

Q3.

Figure 5 shows a diagram of an atom of sulfur.

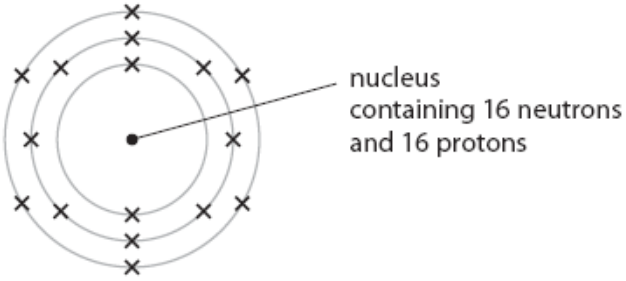


Figure 5

(i) State why this atom of sulfur has an atomic number of 16 and a mass number of 32.

(2)

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(ii) Give the electronic configuration of an atom of sulfur.

(1)

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(Total for question = 3 marks)

Q4.

Most of the fuels used today are obtained from crude oil.

Figure 14 shows the formulae of a molecule of butane and of a molecule of pentane. Butane and pentane are neighbouring members of the same homologous series.

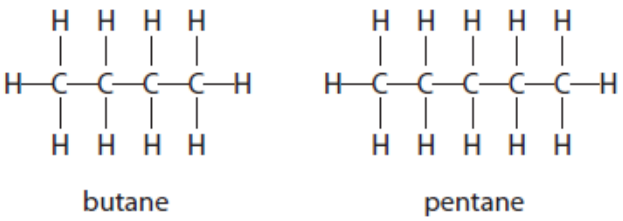


Figure 14

(i) Explain, using these formulae, why butane and pentane are neighbouring members of the same homologous series.

(2)

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(ii) Butane has the formula C_4H_{10}.

Calculate the mass of carbon in 100 g of butane.

Give your answer to three significant figures.

(relative atomic masses: H = 1.00, C = 12.0;
relative formula mass: C_4H_{10} = 58.0)

You must show your working.

(3)

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mass of carbon = ... g

(iii) Butane burns completely in air to form carbon dioxide and water.

Write the word equation for this reaction.

(2)

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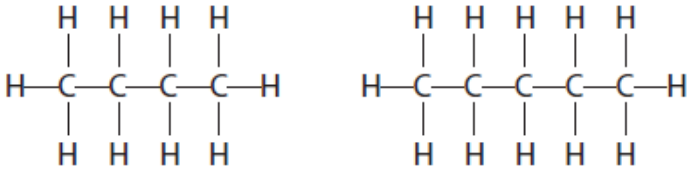
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(Total for question = 7 marks)

Q5.

Most of the fuels used today are obtained from crude oil.

Figure 2 shows the formulae of a molecule of butane and of a molecule of pentane.
Butane and pentane are neighbouring members of the same homologous series.



butane pentane

Figure 2

(i) Explain, using these formulae, why butane and pentane are neighbouring members of the same homologous series.

(2)

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Calculate the mass of carbon in 100 g of butane.

Give your answer to three significant figures.

(relative atomic masses: H = 1.00, C = 12.0;
relative formula mass: C_4H_{10} = 58.0)

You must show your working.

(3)

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mass of carbon = ... g

(Total for question = 5 marks)

Q6.

The concentration of a solution can be calculated using the equation

$$\text{concentration of solution} = \frac{\text{mass of solid}}{\text{volume of solution}}$$

A student dissolved 9.25 g of ammonium chloride in water and made up the solution to a volume of 200 cm^3.

Use the equation to calculate the concentration of this solution in g dm^{-3}.

(2)

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.....

concentration = ... g dm^{-3}

(Total for question = 2 marks)

Q7.

* A sample of magnesium contains

79% of magnesium-24 atoms
10% of magnesium-25 atoms
11% of magnesium-26 atoms.

In most calculations the relative atomic mass of magnesium used is 24.

Use this information to explain why, in this sample, magnesium has a relative atomic mass of 24.3.

(6)

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(Total for question = 6 marks)

Q8.

Many elements are useful in everyday life.

The mass of a sample of pure gold is compared to the mass of a sample of an alloy of gold. The two samples have the **same total number of atoms** but the alloy of gold contains both gold atoms and silver atoms.

What is the description and explanation for the mass of the alloy compared to the mass of pure gold?

Use the periodic table to help you.

(1)

The sample of the alloy is

☒ **A** heavier because silver atoms are heavier than gold atoms

☒ **B** lighter because silver atoms are lighter than gold atoms

☒ **C** unchanged because the number of atoms is the same

☒ **D** unchanged because atoms have a negligible mass

(Total for question = 1 mark)

Q9.

(a) A separating funnel is shown.



The separating funnel can be used to separate two immiscible liquids, such as oil and water.

Describe how you would use a separating funnel to separate two immiscible liquids.

(2)

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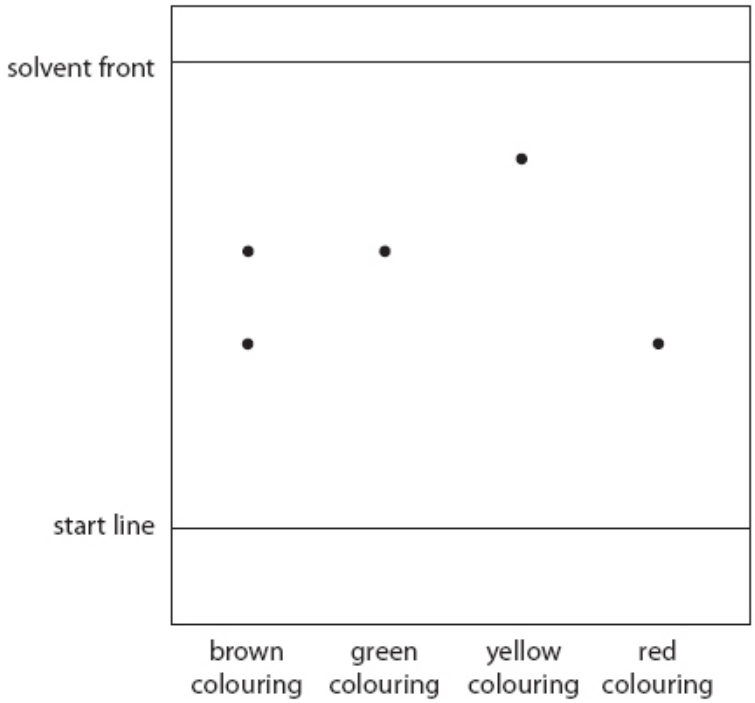
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(b) Paper chromatography can be used to separate coloured substances.

A student carried out a chromatography experiment on four food colourings.
The four food colourings were brown, green, yellow and red.

The diagram shows the results.



Use the results of the chromatography experiment to describe the colours present in the brown food colouring.

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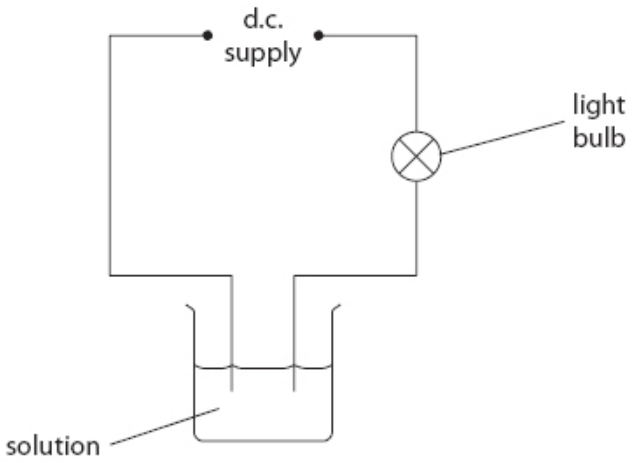
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(c) An experiment is carried out on two solutions to see if they conduct electricity.

The apparatus used is shown.



The two solutions used are sodium chloride solution and sucrose solution.
Sodium chloride is an ionic compound.
Sucrose is a simple molecular, covalent compound.

Explain what happens when each solution is tested in the circuit shown.

(3)

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(d) Calculate the relative formula mass of water, H_2O.

(Relative atomic masses: H = 1.0, O = 16)

(1)

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relative formula mass = ...

(Total for Question = 8 marks)

Q10.

(a) A separating funnel is shown.



The separating funnel can be used to separate two immiscible liquids, such as oil and water.

Describe how you would use a separating funnel to separate two immiscible liquids.

(2)

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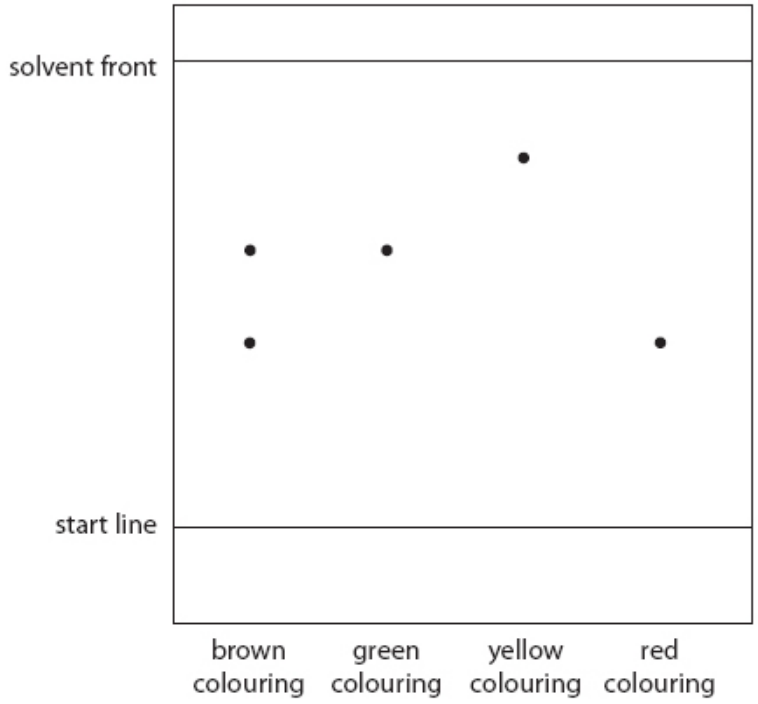
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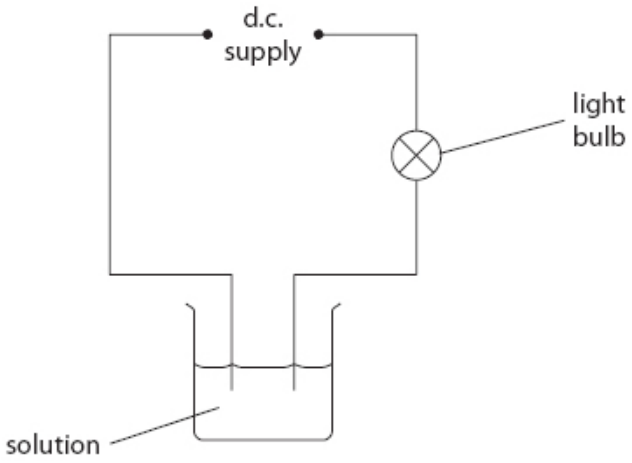
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The apparatus used is shown.



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Sucrose is a simple molecular, covalent compound.

Explain what happens when each solution is tested in the circuit shown.

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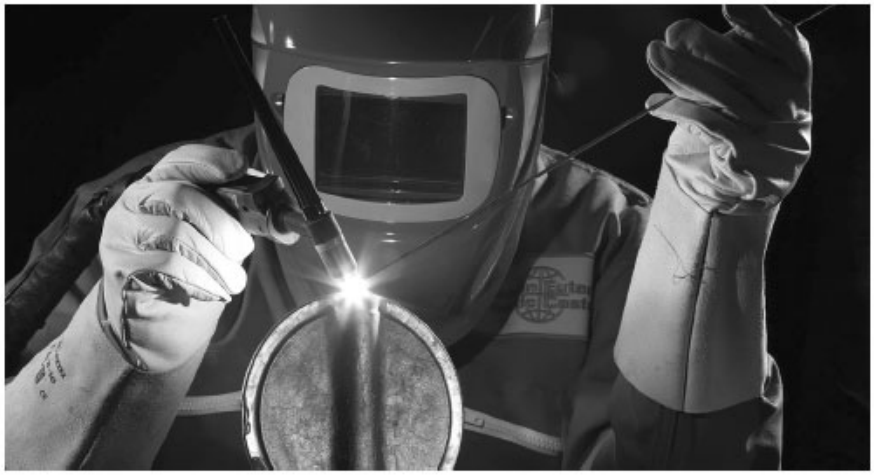
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relative formula mass = ...

(Total for Question = 8 marks)

Q11.

Two pieces of metal can be joined by welding them together.



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

The structure of a metal is a lattice of

(1)

☒ **A** anions

☒ **B** anions and cations

☒ **C** cations in a sea of electrons

☒ **D** molecules in a sea of electrons

(ii) To join two pieces of metal by welding, they must be melted together.

State why a high temperature has to be used.

(1)

.....

.....

(iii) The pieces of metal are welded together in an atmosphere of argon.

Explain why an atmosphere of argon is used.

(2)

.....

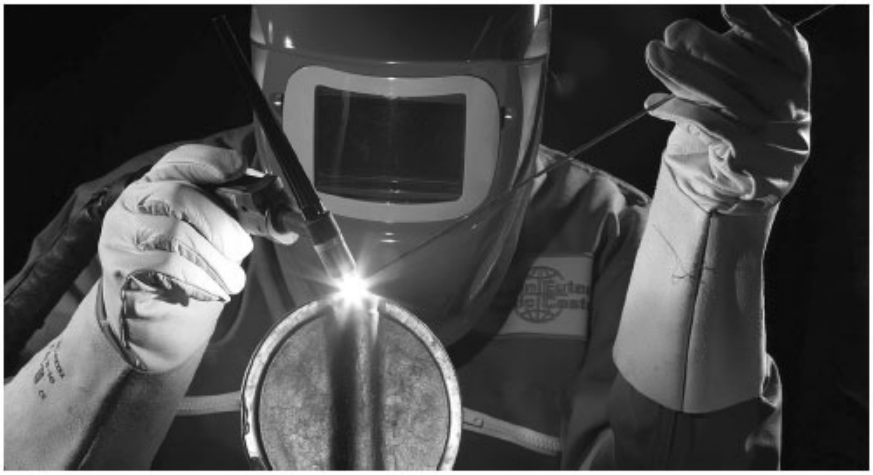
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Q12.

Two pieces of metal can be joined by welding them together.



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

The structure of a metal is a lattice of

(1)

☒ **A** anions

☒ **B** anions and cations

☒ **C** cations in a sea of electrons

☒ **D** molecules in a sea of electrons

(ii) To join two pieces of metal by welding, they must be melted together.

State why a high temperature has to be used.

(1)

.....

.....

(iii) The pieces of metal are welded together in an atmosphere of argon.

Explain why an atmosphere of argon is used.

(2)

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Q13.

Water is a simple molecular, covalent substance.

Explain, in terms of forces between the molecules, why water at room temperature is a liquid and not a solid.

(3)

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(Total for question = 3 marks)

Q14.

Hydrogen reacts with chlorine to form hydrogen chloride.

Write the word equation for this reaction.

(1)

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(Total for question = 1 mark)

Q15.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

When chromium reacts with oxygen, chromium oxide is formed.

(i) Write the word equation for this reaction.

(1)

..... + ... →
.....

(ii) What type of reaction occurs when chromium reacts with oxygen?

(1)

☒ **A** condensation

☒ **B** evaporation

☒ **C** neutralisation

☒ **D** oxidation

(iii) Calculate the relative formula mass of chromium oxide, Cr_2O_3.

(relative atomic masses: O = 16, Cr = 52)

(2)

.....

.....

relative formula mass = ...

(Total for question = 4 marks)

Q16.

Potassium carbonate reacts with dilute sulfuric acid to form potassium sulfate.

(i) Potassium sulfate contains potassium ions, K^+, and sulfate ions, SO_4^{2-}.

Write the formula of potassium sulfate.

(1)

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(ii) Equal volumes of a solution of potassium carbonate were reacted separately with an excess of dilute sulfuric acid solution.
Pure dry samples of potassium sulfate were obtained from the resulting solutions.

The experiment was repeated three times using the same conditions.

The masses of potassium sulfate obtained were

experiment 1 = 5.22 g
experiment 2 = 5.24 g
experiment 3 = 5.21 g

Calculate the mean mass of potassium sulfate obtained, giving your answer to two decimal places.

(2)

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.....

mean mass of potassium sulfate = ... g

(Total for question = 3 marks)

Q17.

Figure 4 shows the atomic number and mass number of two isotopes of argon.

isotope	atomic number	mass number
argon-38	18	38
argon-40	18	40

Figure 4

Describe the structure of an atom of argon-38 and of an atom of argon-40.

(3)

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(Total for question = 3 marks)

Q18.

Covalent substances can be simple molecular covalent or giant covalent.

* Figure 8 shows the arrangement of carbon atoms in diamond, graphene and a fullerene (C_{60}).

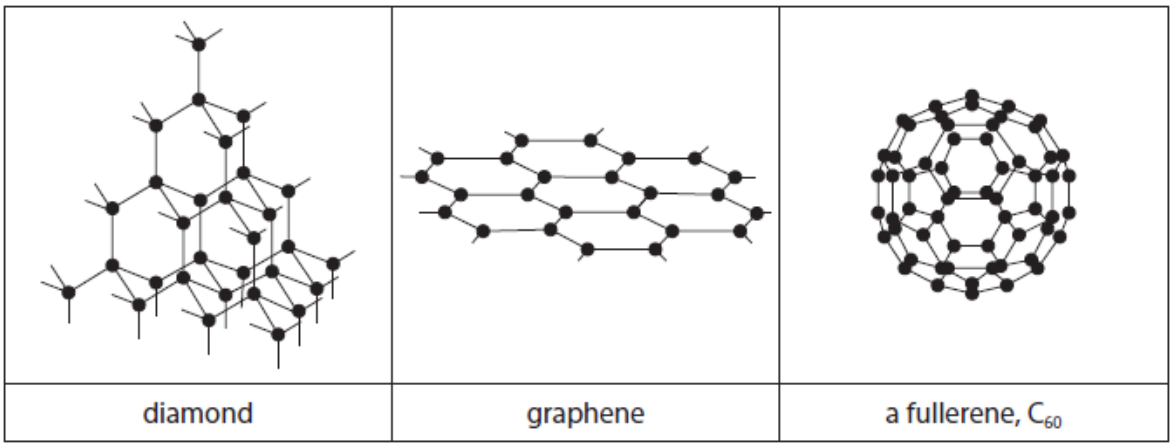


Figure 8

Consider these three substances.

Explain, in terms of their structures and bonding, their relative melting points, strengths and abilities to conduct electricity.

(Total for question = 6 marks)

Q19.

Figure 4 shows information about the charges and relative masses of the three subatomic particles.

	particle **A**	particle **B**	particle **C**
charge	positive	neutral	negative
relative mass	1	1	$\frac{1}{1840}$

Figure 4

Use the information to give the names of particles **A**, **B** and **C**.

(2)

particle **A**

.....

particle **B**

.....

particle **C**

.....

(Total for question = 2 marks)

Q20.

When heated, zinc carbonate decomposes to form zinc oxide and carbon dioxide gas.

$$ZnCO_3 \rightarrow ZnO + CO_2$$

A student investigated the decomposition of a sample of zinc carbonate.

The student used the following method.

step 1 the mass of an empty crucible was determined

step 2 a sample of zinc carbonate was placed into the crucible

step 3 the mass of the crucible and the zinc carbonate was determined

step 4 the crucible and zinc carbonate was heated for five minutes

step 5 the mass of the crucible and contents was determined.

Figure 1 shows the apparatus used.

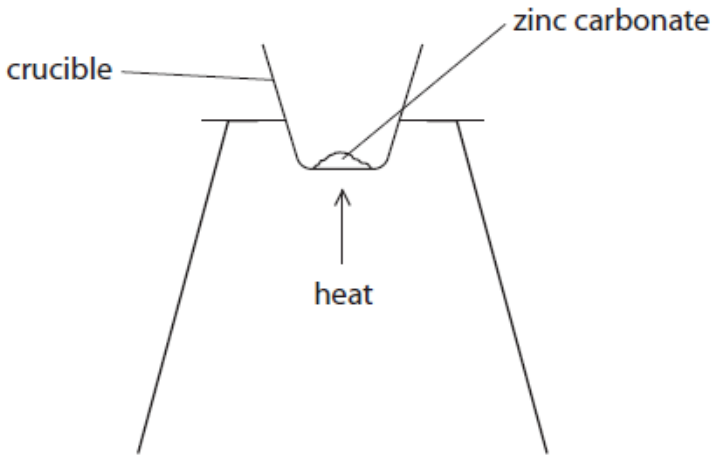


Figure 1

Suggest how the student could confirm that the decomposition was complete.

(3)

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(Total for question = 3 marks)

Q21.

Salts of metals can be prepared by reacting the metal with an acid to produce the salt and hydrogen.

(i) Describe the test to show that the gas is hydrogen.

(2)

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(ii) Nickel is a metal.

Explain how the structure of a nickel atom, Ni, changes when it forms a nickel ion, Ni^{2+}.

(2)

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.....

(Total for question = 4 marks)

Q22.

Salts of metals can be prepared by reacting the metal with an acid to produce the salt and hydrogen.

(i) Describe the test to show the gas is hydrogen.

(2)

.....

.....

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.....

(ii) Nickel is a metal.

Explain how the structure of a nickel atom, Ni, changes when it forms a nickel ion, Ni^{2+}.

(2)

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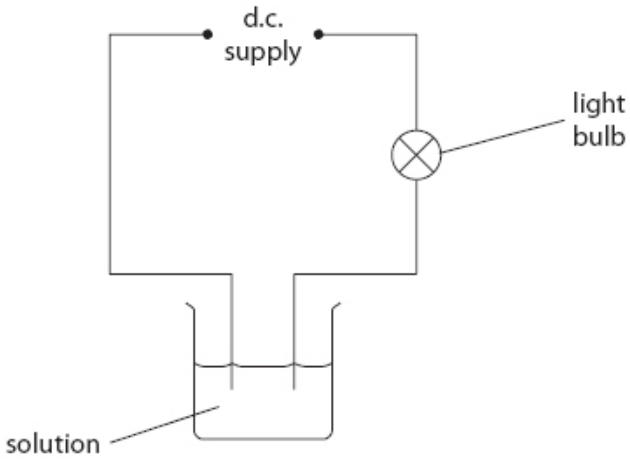
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(Total for question = 4 marks)

Q23.

An experiment is carried out on two solutions to see if they conduct electricity.

The apparatus used is shown.



The two solutions used are sodium chloride solution and sucrose solution.
Sodium chloride is an ionic compound.
Sucrose is a simple molecular, covalent compound.

Explain what happens when each solution is tested in the circuit shown.

(3)

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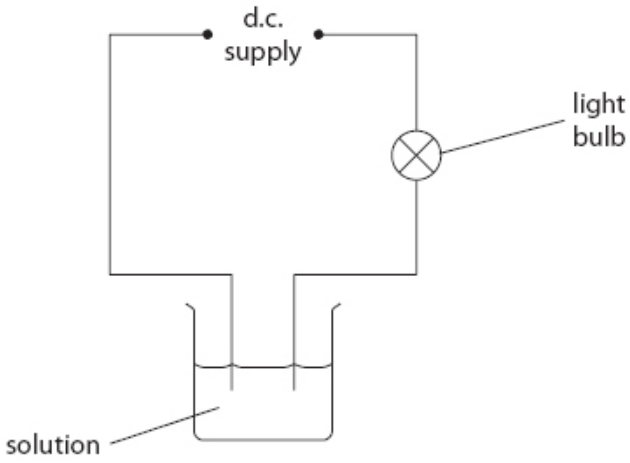
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Q24.

An experiment is carried out on two solutions to see if they conduct electricity.

The apparatus used is shown.



The two solutions used are sodium chloride solution and sucrose solution.
Sodium chloride is an ionic compound.
Sucrose is a simple molecular, covalent compound.

Explain what happens when each solution is tested in the circuit shown.

(3)

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Q25.

The elements beryllium, magnesium, calcium, strontium and barium are in group 2 of the periodic table.

Each calcium atom contains 20 electrons.

Which of the following is the electronic configuration of a calcium atom?

(1)

☒ **A** 2.8.10

☒ **B** 2.8.8.2

☒ **C** 2.2.8.8

☒ **D** 8.10.2

(Total for question = 1 mark)

Q26.

Barium sulfate contains

barium ions, Ba^{2+}
sulfate ions, SO_4^{2-}

(i) Give the formula of barium sulfate.

(1)

.....

(ii) Give the meaning of the term **ion.**

(1)

.....

.....

Q27.

Barium sulfate contains

barium ions, Ba^{2+}
sulfate ions, SO_4^{2-}

(i) Give the formula of barium sulfate.

(1)

.....

(ii) Give the meaning of the term **ion.**

(1)

.....

.....

Q28.

The equation for the reaction that occurs in the Haber process is

$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$

(i) Use the periodic table to give the number of the group and of the period of nitrogen.

(2)

group

.....

period

.....

(ii) State what is meant by the symbol $\rightleftharpoons$ in the equation.

(1)

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.....

(Total for question = 3 marks)

Q29.

A compound of sulfur was analysed to determine its empirical formula.

(i) State the meaning of the term **empirical formula**.

(1)

.....

.....

(ii) A compound of sulfur and fluorine contains 4.8 g of sulfur and 17.1 g of fluorine.

Calculate the empirical formula of this compound.

You must show your working.
(Relative atomic masses: F = 19, S = 32)

(3)

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empirical formula = ...

(Total for question = 4 marks)

Q30.

A compound of sulfur was analysed to determine its empirical formula.

(i) State the meaning of the term **empirical formula**.

(1)

.....

.....

(ii) A compound of sulfur and fluorine contains 4.8 g of sulfur and 17.1 g of fluorine.

Calculate the empirical formula of this compound.

You must show your working.
(relative atomic masses: F = 19, S = 32)

(3)

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empirical formula = ...

(Total for question = 4 marks)

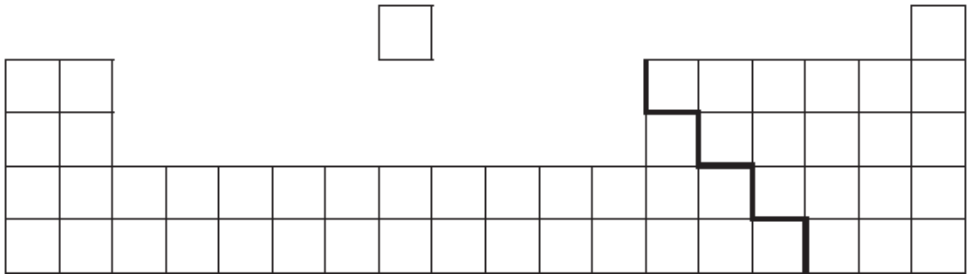
Q31.

* Here is some information about the periodic table.

In the periodic table elements are arranged in rows and columns.
The position of an element in the periodic table depends on its atomic structure.
Elements with similar chemical properties are found in the same parts of the periodic table.

Identify different parts of the periodic table and explain how the position of an element in the periodic table is linked to its chemical properties and atomic structure.

(You are provided with an outline of the periodic table below and you may use this to help your answer.)



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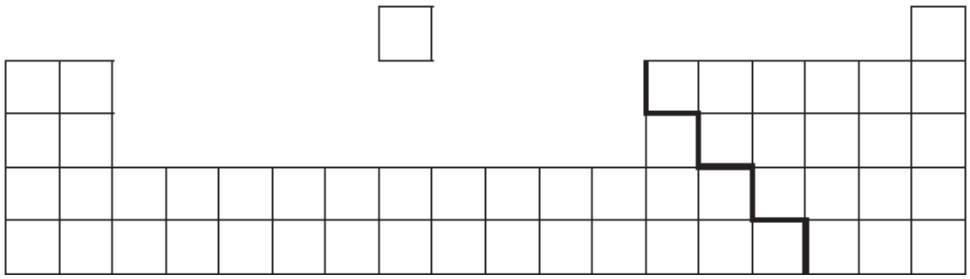
Q32.

* Here is some information about the periodic table.

In the periodic table elements are arranged in rows and columns.
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Identify different parts of the periodic table and explain how the position of an element in the periodic table is linked to its chemical properties and atomic structure.

(You are provided with an outline of the periodic table below and you may use this to help your answer.)



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