PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

CHEMISTRY



EXAM QUESTION PACK

TOPIC 1: KEY CONCEPTS IN CHEMISTRY: TYPES OF SUBSTANCE (PAPER 1)

SCORE	PERCENTAGE
/182	%

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Q1.

This question is about electrolysis.

Figure 3 shows the electrolysis of copper chloride solution.

(i) Use the words from the box to complete the labelling of the diagram in Figure 3.

(2)

anode	cathode	electrolyte

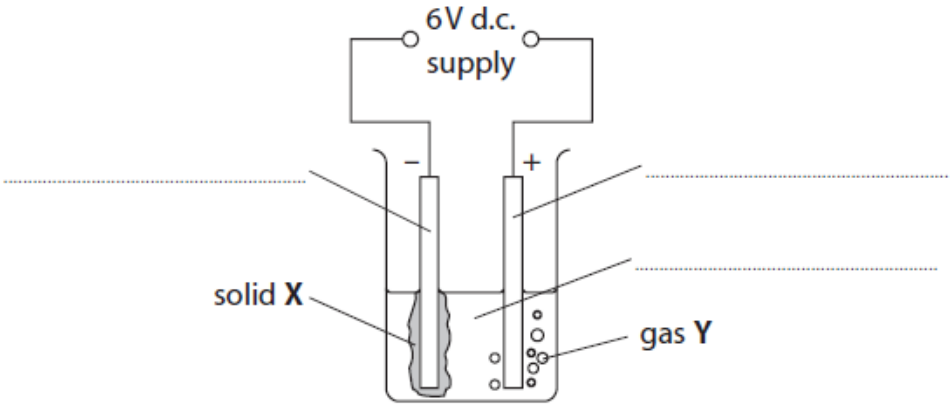


Figure 3

(ii) The products of the electrolysis shown in Figure 3 are solid **X** and gas **Y**.

Draw **one** straight line from each product to its name.

(2)

product	name
solid **X**	carbon
	chlorine
	copper
gas **Y**	hydrogen

(iii) The experiment is repeated using powdered solid copper chloride instead of copper chloride solution.

Nothing happens and no products are formed.

Explain why nothing happens and no products are formed.

(2)

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(Total for question = 6 marks)

(**Q02b 1SC0/1CF, June 2023**)

Q2.

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 ☒.

Magnesium is a metal.

(i) State **one** physical property of magnesium.

(1)

.....

(ii) Which element is in the same group of the periodic table as magnesium? Use the periodic table to help you answer this question.

(1)

☒ **A** carbon

☒ **B** chromium

☒ **C** sodium

☒ **D** strontium

(Total for question = 2 marks)

Q3.

Nitrogen, N_2 , oxygen, O_2 and fluorine F_2 are all gases.

Fluorine has a boiling point of −188 °C.

(i) Explain why fluorine has a low boiling point.

(3)

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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 (☒).

(ii) A mixture of nitrogen and oxygen becomes a liquid when cooled to −200 °C.

Which row shows the changes in energy and movement of the molecules as they are cooled from room temperature to −200 °C?

(1)

		movement of molecules	energy of molecules
☒	**A**	less	more
☒	**B**	more	less
☒	**C**	less	less
☒	**D**	more	more

(iii) The mixture of liquid nitrogen and liquid oxygen can be separated.

Which process could be used to separate a mixture of liquid nitrogen and liquid oxygen?

(1)

☒ **A** paper chromatography

☒ **B** fractional distillation

☒ **C** filtration

☒ **D** crystallisation

(Total for question = 5 marks)

(**QU03b 1SC0/1CH, June 2025**)

Q4.

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 (☒).

Sodium carbonate has the formula Na_2CO_3.

Sodium carbonate contains Na^+ ions and CO_3^{2-} ions.

(i) The atomic number of sodium is 11.

What is the electronic configuration of the Na^+ ion?

(1)

☒ **A** 1

☒ **B** 2.8

☒ **C** 2.8.1

☒ **D** 2.8.2

(ii) Explain why solid sodium carbonate **cannot** conduct electricity but a solution of sodium carbonate **can** conduct electricity.

(3)

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(Total for question = 4 marks)

(**Q06a 1SC0/1CF, June 2024**)

Q5.

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 ☒.

Sodium carbonate has the formula Na_2CO_3.

Sodium carbonate contains Na^+ ions and CO_3^{2-} ions.

(i) The atomic number of sodium is 11.

What is the electronic configuration of the Na^+ ion?

(1)

☐ **A** 1

☐ **B** 2.8

☐ **C** 2.8.1

☐ **D** 2.8.2

(ii) Explain why solid sodium carbonate **cannot** conduct electricity but a solution of sodium carbonate **can** conduct electricity.

(3)

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(Total for question = 4 marks)

(**QU02a 1SC0/1CH, June 2024**)

Q6.

This question is about the properties of different substances.

Silicon tetrachloride is a simple molecular covalent compound.

(i) A molecule of silicon tetrachloride is composed of a silicon atom and four chlorine atoms.

- a silicon atom has 4 outer electrons
- a chlorine atom has 7 outer electrons

Draw a dot and cross diagram of a molecule of silicon tetrachloride, $SiCl_4$.

Show outer electrons only.

(2)

(ii) Explain why simple molecular covalent compounds such as silicon tetrachloride have low melting and boiling points.

(2)

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(Total for question = 4 marks)

(**QU05a 1SC0/1CH, June 2024**)

Q7.

Sodium fluoride is an ionic compound.

(i) Describe how a sodium atom and a fluorine atom interact to form a sodium ion, Na^+, and a fluoride ion, F^-.

(2)

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(ii) Explain why sodium fluoride is able to conduct electricity when it is molten but not when it is solid.

(2)

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.....

(Total for question = 4 marks)

(**Q05d 1SC0/2CF/S2, SAM**)

Q8.

Sodium fluoride is an ionic compound.

(i) Describe how a sodium atom and a fluorine atom interact to form a sodium ion, Na^+, and a fluoride ion, F^-.

(2)

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(ii) Explain why sodium fluoride is able to conduct electricity when it is molten but not when it is solid.

(2)

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(Total for question = 4 marks)

(**Q01d 1SC0/2CH/S2, SAM**)

Q9.

Nitrogen and oxygen are present in the air.

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

Oxygen has a low boiling point because there are

(1)

☒ **A** weak covalent bonds between the oxygen atoms

☒ **B** weak covalent bonds between the oxygen molecules

☒ **C** weak forces of attraction between the oxygen atoms

☒ **D** weak forces of attraction between the oxygen molecules

(**Q19 1SC0/1CH, June 2013**)

Q10.

Nitrogen and oxygen are present in the air.

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

Oxygen has a low boiling point because there are

(1)

☒ **A** weak covalent bonds between the oxygen atoms

☒ **B** weak covalent bonds between the oxygen molecules

☒ **C** weak forces of attraction between the oxygen atoms

☒ **D** weak forces of attraction between the oxygen molecules

(**Q10 1SC0/2CH, June 2013**)

Q11.

Bonding and separation techniques

(a) The diagram shows the structure of diamond.



(i) Describe what each ● represents.

(2)

.....

.....

(ii) State the type of bonding in the diamond structure.

(1)

.....

(b) Give the name of the process used to obtain oxygen from liquid air.

(2)

.....

.....

(c) A colouring in some sweets was analysed using paper chromatography.

One of the dyes in the colouring moved 2 cm up the paper while the solvent moved 8 cm.

What is the R_f value of this dye?

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

(1)

☒ **A** 0.25

☒ **B** 2

☒ **C** 4

☒ **D** 6

*(d) Here is some information about magnesium, oxygen and magnesium oxide.

The electronic configuration of magnesium atoms is 2.8.2
The electronic configuration of oxygen atoms is 2.6
Magnesium oxide is an ionic compound.

When magnesium ribbon is heated, it reacts with oxygen from the air to form magnesium oxide, MgO.

Describe how the reaction can be carried out, including an explanation of what happens to the magnesium and oxygen atoms when they form magnesium oxide.

(6)

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(Total for question = 12 marks)

(**Q05 1SC0/1CF, June 2014**)

Q12.

Bonding and separation techniques

(a) The diagram shows the structure of diamond.



(i) Describe what each ● represents.

(2)

.....

.....

(ii) State the type of bonding in the diamond structure.

(1)

.....

(b) Give the name of the process used to obtain oxygen from liquid air.

(2)

.....

.....

(c) A colouring in some sweets was analysed using paper chromatography.

One of the dyes in the colouring moved 2 cm up the paper while the solvent moved 8 cm.

What is the R_f value of this dye?

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

(1)

☒ **A** 0.25

☒ **B** 2

☒ **C** 4

☒ **D** 6

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Describe how the reaction can be carried out, including an explanation of what happens to the magnesium and oxygen atoms when they form magnesium oxide.

(6)

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(Total for question = 12 marks)

(**Q05 1SC0/2CF, June 2014**)

Q13.

Chlorine exists as diatomic molecules.

In a molecule, two chlorine atoms are joined by a covalent bond.

(i) Describe what is meant by a **covalent bond**.

(2)

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(ii) Explain why chlorine is a gas, rather than a liquid, at room temperature.

(2)

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(Total for question = 4 marks)

(**Q22 1SC0/2CF, June 2018**)

Q14.

Chlorine exists as diatomic molecules.

In a molecule, two chlorine atoms are joined by a covalent bond.

(i) Describe what is meant by a **covalent bond**.

(2)

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(ii) Explain why chlorine is a gas, rather than a liquid, at room temperature.

(2)

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(Total for question = 4 marks)

(**Q06 1SC0/2CH, June 2018**)

Q15.

(a) Calcium nitrate solution reacts with sodium carbonate solution.
The products are calcium carbonate and another salt.

Write the word equation for this reaction.

(2)

.....

.....

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

The colour produced in a flame test by calcium ions is

(1)

☒ **A** green

☒ **B** lilac

☒ **C** orange-red

☒ **D** yellow

(ii) Describe how a flame test is carried out on a solid.

(2)

.....

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(c) If calcium carbonate is heated strongly, it decomposes.

$$CaCO_3 \rightarrow CaO + CO_2$$

If 100 g of calcium carbonate is heated a calculation shows that 44 g carbon dioxide should be formed.

(i) In an experiment 100 g of calcium carbonate was heated and only 40 g carbon dioxide was formed.

Calculate the percentage yield of carbon dioxide in this reaction.

(2)

.....

.....

percentage yield of carbon dioxide =.....%

(ii) Suggest a reason why only 40 g of carbon dioxide was formed in the experiment.

(1)

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

Ionic compounds

(1)

☒ **A** conduct electricity when solid

☒ **B** do not conduct electricity when molten

☒ **C** have low boiling points

☒ **D** have high melting points

(Total for Question = 9 marks)

(**Q10 1SC0/1CF, June 2013**)

Q16.

(a) Calcium nitrate solution reacts with sodium carbonate solution.
The products are calcium carbonate and another salt.

Write the word equation for this reaction.

(2)

.....

.....

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

The colour produced in a flame test by calcium ions is

(1)

☒ **A** green

☒ **B** lilac

☒ **C** orange-red

☒ **D** yellow

(ii) Describe how a flame test is carried out on a solid.

(2)

.....

.....

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(c) If calcium carbonate is heated strongly, it decomposes.

$$CaCO_3 \rightarrow CaO + CO_2$$

If 100 g of calcium carbonate is heated a calculation shows that 44 g carbon dioxide should be formed.

(i) In an experiment 100 g of calcium carbonate was heated and only 40 g carbon dioxide was formed.

Calculate the percentage yield of carbon dioxide in this reaction.

(2)

.....

.....

percentage yield of carbon dioxide =.....%

(ii) Suggest a reason why only 40 g of carbon dioxide was formed in the experiment.

(1)

.....

.....

.....

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

Ionic compounds

(1)

☒ **A** conduct electricity when solid

☒ **B** do not conduct electricity when molten

☒ **C** have low boiling points

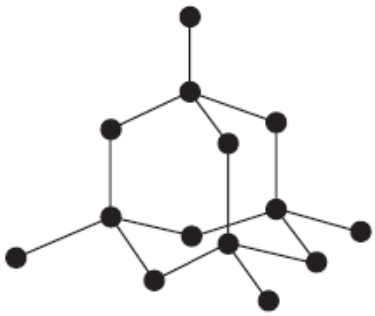
☒ **D** have high melting points

(Total for Question = 9 marks)

(**Q04 1SC0/2CF, June 2013**)

Q17.

The arrangement of carbon atoms in diamond is shown.



diamond

Explain why diamond has a very high melting point.

(2)

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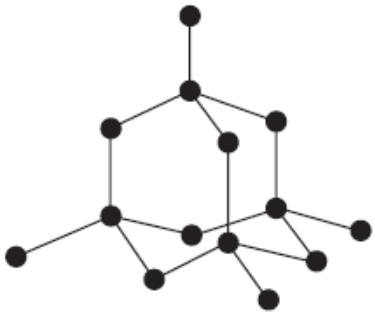
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(**Q24 1SC0/1CF, June 2015**)

Q18.

The arrangement of carbon atoms in diamond is shown.



diamond

Explain why diamond has a very high melting point.

(2)

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.....

(**Q12 1SC0/2CF, June 2015**)

Q19.

Chlorine and carbon

(a) Chlorine has an atomic number of 17.
Chlorine-35 and chlorine-37 are two isotopes of chlorine.

(i) Complete the table to show the numbers of protons, neutrons and electrons in each of the isotopes.

(2)

	chlorine-35	chlorine-37
number of protons		
number of neutrons		
number of electrons		

(ii) A normal sample of chlorine contains only chlorine-35 and chlorine-37 atoms.

Explain why the relative atomic mass of chlorine is 35.5

(2)

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(b) Tetrachloromethane is a simple molecular, covalent compound. The formula of its molecule is CCl_4.

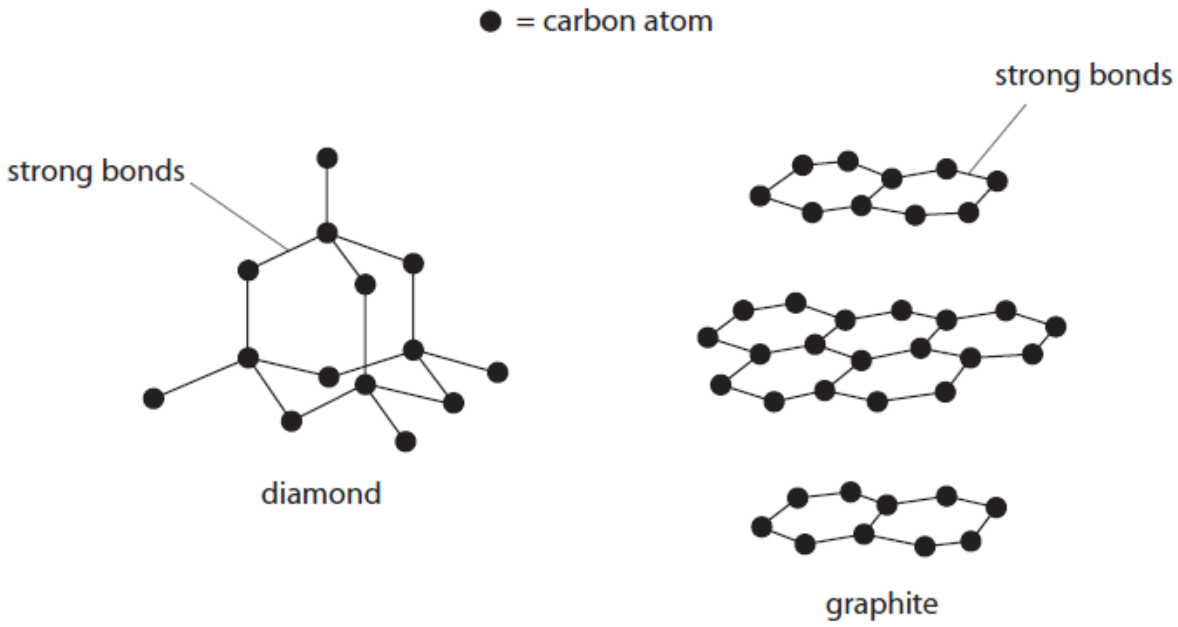
There are four electrons in the outer shell of a carbon atom.
There are seven electrons in the outer shell of a chlorine atom.

Draw a dot and cross diagram to show the bonding in a molecule of tetrachloromethane, CCl_4.

Show outer shell electrons only.

(2)

*(c) The diagrams show the arrangements of carbon atoms in diamond and in graphite.



Compare a use of diamond with a use of graphite, explaining each use in terms of the bonding and structure. In your answer you should use information from the diagrams.

(6)

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(Total for question = 12 marks)

(**Q06 1SC0/1CH, June 2014**)

Q20.

Chlorine and carbon

(a) Chlorine has an atomic number of 17.
Chlorine-35 and chlorine-37 are two isotopes of chlorine.

(i) Complete the table to show the numbers of protons, neutrons and electrons in each of the isotopes.

(2)

	chlorine-35	chlorine-37
number of protons		
number of neutrons		
number of electrons		

(ii) A normal sample of chlorine contains only chlorine-35 and chlorine-37 atoms.

Explain why the relative atomic mass of chlorine is 35.5

(2)

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(b) Tetrachloromethane is a simple molecular, covalent compound. The formula of its molecule is CCl_4.

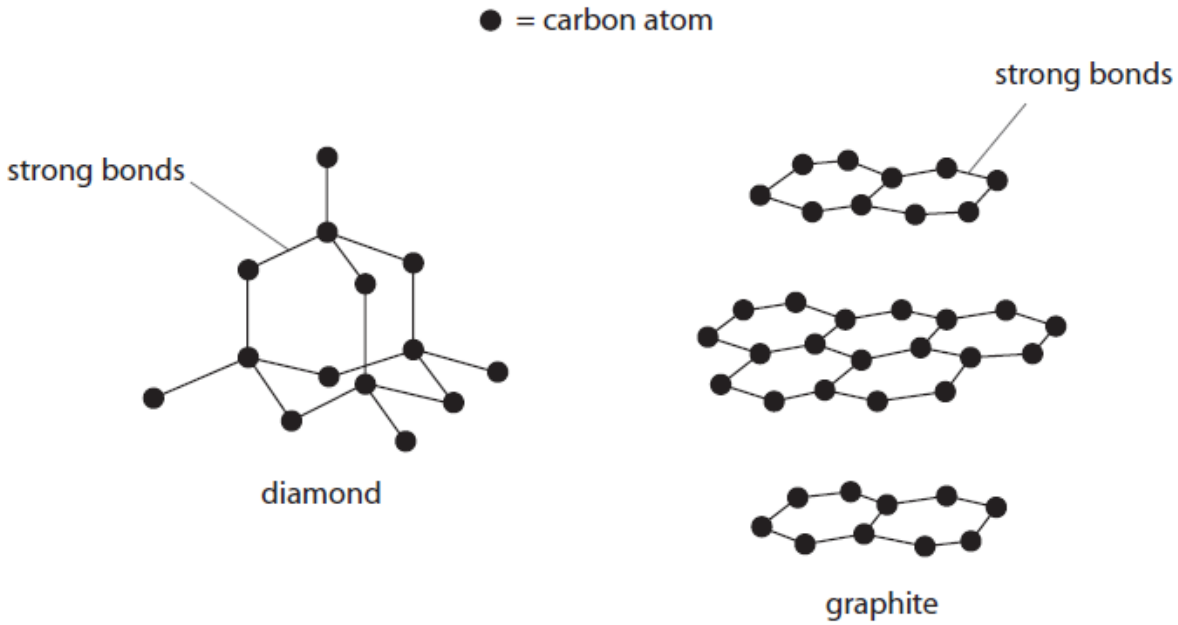
There are four electrons in the outer shell of a carbon atom.
There are seven electrons in the outer shell of a chlorine atom.

Draw a dot and cross diagram to show the bonding in a molecule of tetrachloromethane, CCl_4.

Show outer shell electrons only.

(2)

*(c) The diagrams show the arrangements of carbon atoms in diamond and in graphite.



Compare a use of diamond with a use of graphite, explaining each use in terms of the bonding and structure. In your answer you should use information from the diagrams.

(6)

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(Total for question = 12 marks)

(**Q05 1SC0/2CH, June 2014**)

Q21.

Compounds

(a) (i) Balance the equation for the reaction between sodium and chlorine to produce sodium chloride by putting numbers in the spaces provided.

(2)

..... Na + Cl_2 → ..... NaCl

(ii) In an experiment to make sodium chloride, the yield is 2.5 g.
The theoretical yield of sodium chloride for this experiment is 4.0 g.

Calculate the percentage yield of sodium chloride in this experiment.

(2)

.....

.....

.....

percentage yield = ... %

(iii) Sodium chloride has a high melting point.
Sodium chloride does not conduct electricity when solid but does conduct electricity when molten.

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

These properties show that the structure of sodium chloride is

(1)

☒ **A** ionic

☒ **B** giant molecular, covalent

☒ **C** simple molecular, covalent

☒ **D** metallic

(iv) Calculate the relative formula mass of sodium chloride, NaCl. (relative atomic masses: Na = 23, Cl = 35.5)

(1)

.....

relative formula mass = ...

(b) Calculate the percentage by mass of magnesium in magnesium sulfate, $MgSO_4$.

(relative atomic masses: O = 16, Mg = 24, S = 32

relative formula mass: $MgSO_4$ = 120)

(2)

.....

.....

.....

percentage of magnesium = ... %

(c) The formula of a molecule of ethane is C_2H_6.

(i) Give the empirical formula of ethane.

(1)

.....

(ii) Ethane is a simple molecular, covalent compound.

Ethane has a low boiling point.

Explain, in terms of particles it contains, why ethane has a low boiling point.

(2)

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(Total for question = 11 marks)

(**Q04 1SC0/1CF, June 2014**)

Q22.

Compounds

(a) (i) Balance the equation for the reaction between sodium and chlorine to produce sodium chloride by putting numbers in the spaces provided.

(2)

..... Na + Cl_2 → ..... NaCl

(ii) In an experiment to make sodium chloride, the yield is 2.5 g.
The theoretical yield of sodium chloride for this experiment is 4.0 g.

Calculate the percentage yield of sodium chloride in this experiment.

(2)

.....

.....

.....

percentage yield = ... %

(iii) Sodium chloride has a high melting point.
Sodium chloride does not conduct electricity when solid but does conduct electricity when molten.

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

These properties show that the structure of sodium chloride is

(1)

☒ **A** ionic

☒ **B** giant molecular, covalent

☒ **C** simple molecular, covalent

☒ **D** metallic

(iv) Calculate the relative formula mass of sodium chloride, NaCl. (relative atomic masses: Na = 23, Cl = 35.5)

(1)

.....

relative formula mass = ...

(b) Calculate the percentage by mass of magnesium in magnesium sulfate, $MgSO_4$.

(relative atomic masses: O = 16, Mg = 24, S = 32

relative formula mass: $MgSO_4$ = 120)

(2)

.....

.....

.....

percentage of magnesium = ... %

(c) The formula of a molecule of ethane is C_2H_6.

(i) Give the empirical formula of ethane.

(1)

.....

(ii) Ethane is a simple molecular, covalent compound.

Ethane has a low boiling point.

Explain, in terms of particles it contains, why ethane has a low boiling point.

(2)

.....

.....

.....

.....

(Total for question = 11 marks)

(**Q04 1SC0/2CF, June 2014**)

Q23.

* Figure 4 shows some properties of three substances, **A**, **B** and **C**.

substance	melting point in °C	ability to conduct electricity	
		solid	molten
A	1180	poor	good
B	1538	good	good
C	115	poor	poor

Figure 4

Deduce, using the information in Figure 4, the structure and bonding of substances **A**, **B** and **C**, explaining their properties in terms of their structure and bonding.

(6)

(Total for question = 6 marks)

(**Q06c 1SC0/1CH, Nov 2021**)

Q24.

Silver nitrate and potassium chloride are ionic compounds that are soluble in water.

Silver nitrate solution conducts electricity.
Solid silver also conducts electricity.

Describe how silver nitrate solution conducts electricity and how solid silver conducts electricity.

(3)

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(Total for question = 3 marks)

(**QU06b 1SC0/1CF, June 2025**)

Q25.

Silver nitrate and potassium chloride are ionic compounds that are soluble in water.

Silver nitrate solution conducts electricity.
Solid silver also conducts electricity.

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(Total for question = 3 marks)

(**QU02b 1SC0/1CH, June 2025**)

Q26.

Figure 6 shows how the conductivity of one solution changes as its concentration increases.

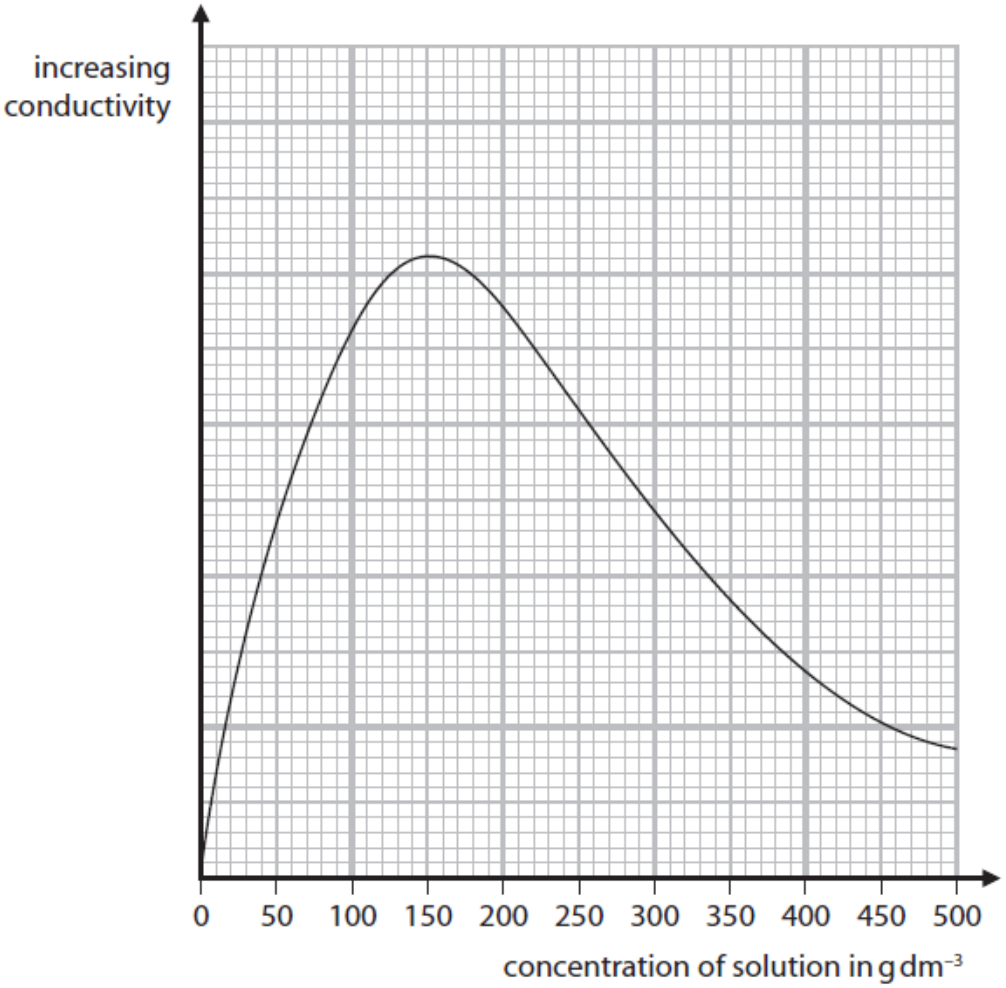


Figure 6

Describe how the conductivity of this solution changes as its concentration increases from 0 to 500 g dm^{-3}.

(2)

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(Total for question = 2 marks)

(**Q03e 1SC0/2CF, Nov 2020**)

Q27.

Figure 13 shows a model of how particles are arranged in a solid.

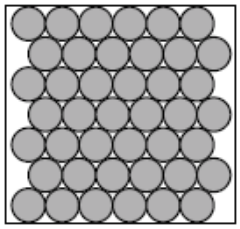


Figure 13

State **two** ways in which this model fails to accurately represent a crystal of sodium chloride.

(2)

1 .....

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2 .....

.....

(Total for question = 2 marks)

(**Q05ai 1SC0/1CH, SAM 2016**)

Q28.

A solid ionic compound is dissolved in water to form a solution.

Describe a simple experiment to show that charged particles are present in this solution.

(3)

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(Total for question = 3 marks)

(**Q19 1SC0/2CH, June 2018**)

Q29.

Figure 6 shows the equipment used to electrolyse a sample of sodium sulfate solution.

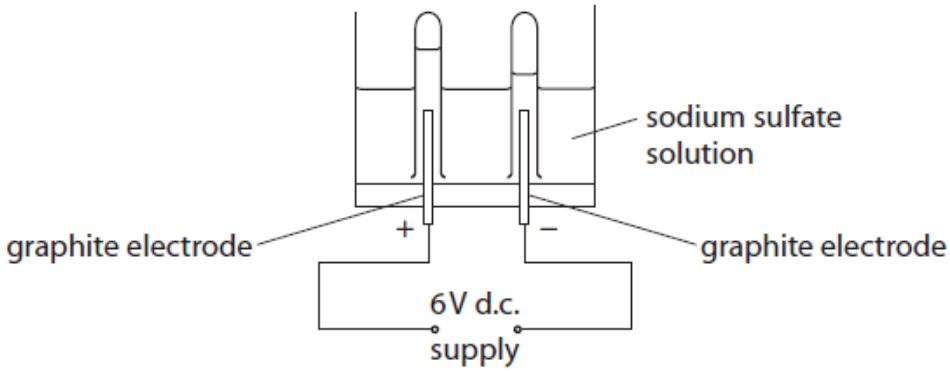


Figure 6

Graphite electrodes are used in the electrolysis of sodium sulfate solution.
Graphite is used because it is inert and conducts electricity.

(i) Figure 7 shows the ions in the sodium sulfate solution.

Draw a circle around each of the ions in Figure 7 that are attracted to the negative graphite electrode during the electrolysis.

(1)



Figure 7

(ii) State why it is important that the electrodes are inert.

(1)

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(iii) Explain, in terms of its structure, how graphite conducts electricity.

(2)

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(Total for question = 4 marks)

(**Q04c 1SC0/1CF, June 2022**)

Q30.

Two compounds of barium are barium sulfide and barium chloride.

Solid sodium chloride is dissolved in water.

The sodium chloride solution is electrolysed in the apparatus shown in Figure 8.

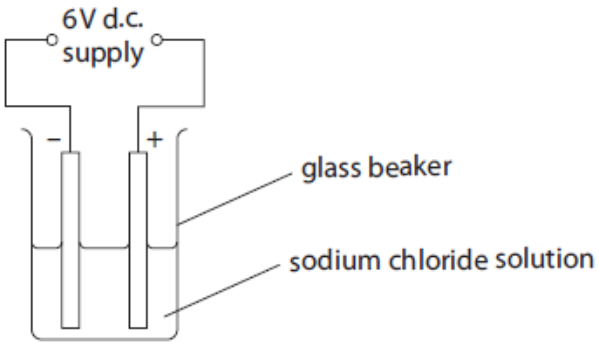


Figure 8

(i) State why sodium chloride solution, rather than solid sodium chloride, must be used in this experiment.

(1)

.....

.....

(ii) The formulae of the ions present in the sodium chloride solution are

Na^+ Cl^- H^+ OH^-

Circle the ions that would be attracted to the anode.

(1)

(iii) Molten lead bromide can be electrolysed to form molten lead and bromine gas.

Explain how a student could modify the apparatus shown in Figure 8 to carry out this

electrolysis.

(2)

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(Total for question = 4 marks)

(**Q13 1SC0/1CF, June 2018**)

Q31.

Elements in the periodic table

(a) Copper is a metal.

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

In the periodic table copper is in

(1)

☒ **A** group 0

☒ **B** group 1

☒ **C** group 7

☒ **D** the transition metals

(ii) Which of these is a property of copper metal?

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

(1)

☒ **A** does not conduct an electric current

☒ **B** forms colourless compounds

☒ **C** has a low melting point

☒ **D** is malleable

(b) Helium and argon are noble gases.

(i) Choose the correct word from this box to complete the sentence below.

non- flammable	odourless	reactive

(1)

Argon can be used to put out fires because it is .....

(ii) Choose the correct phrase from this box to complete the sentence below.

has a high density	has a low density	is colourless



(1)

Helium is used in airships because it .....

(c) Chlorine, bromine and iodine are halogens.

(i) The table shows the appearance of bromine and iodine at room temperature.

Complete the table to show the appearance of chlorine at room temperature.

(2)

halogen	appearance at room temperature
chlorine	
bromine	dark red liquid
iodine	grey solid

(ii) Chlorine reacts with hydrogen to form hydrogen chloride.

Write the word equation for this reaction.

(2)

..... + ... → .....

(Total for question = 8 marks)

(**Q01 1SC0/1CF, June 2014**)

Q32.

Elements in the periodic table

(a) Copper is a metal.

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

In the periodic table copper is in

(1)

☒ **A** group 0

☒ **B** group 1

☒ **C** group 7

☒ **D** the transition metals

(ii) Which of these is a property of copper metal?

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

(1)

☒ **A** does not conduct an electric current

☒ **B** forms colourless compounds

☒ **C** has a low melting point

☒ **D** is malleable

(b) Helium and argon are noble gases.

(i) Choose the correct word from this box to complete the sentence below.

non- flammable	odourless	reactive

(1)

Argon can be used to put out fires because it is .....

(ii) Choose the correct phrase from this box to complete the sentence below.

has a high density	has a low density	is colourless



(1)

Helium is used in airships because it .....

(c) Chlorine, bromine and iodine are halogens.

(i) The table shows the appearance of bromine and iodine at room temperature.

Complete the table to show the appearance of chlorine at room temperature.

(2)

halogen	appearance at room temperature
chlorine	
bromine	dark red liquid
iodine	grey solid

(ii) Chlorine reacts with hydrogen to form hydrogen chloride.

Write the word equation for this reaction.

(2)

..... + ... → .....

(Total for question = 8 marks)

(**Q01 1SC0/2CF, June 2014**)

Q33.

Calcium nitrate and calcium carbonate are both ionic compounds.

Calcium nitrate mixed with water behaves as an electrolyte.
Calcium carbonate mixed with water does not behave as an electrolyte.

Explain, in terms of solubility and movement of ions, this difference in behaviour.

(2)

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(Total for question = 2 marks)

(**Q02c 1SC0/1CH, June 2019**)

Q34.

* A solution of sodium chloride in water needs to be separated to obtain a sample of pure, dry sodium chloride and a sample of pure water.

Figure 7 shows the boiling points of sodium chloride and water.

substance	boiling point in °C
sodium chloride	1465
water	100

Figure 7

Explain this difference in boiling points in terms of the structure and bonding of sodium chloride and water and how this difference is used to choose a method to separate sodium chloride solution into pure, dry sodium chloride and pure water.

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(Total for question = 6 marks)

(**QU06c 1SC0/1CH, June 2023**)

Q35.

* Figure 18 shows the ability of different substances to conduct electricity.

substance	conducts electricity
solid calcium chloride	no
molten calcium chloride	yes
diamond	no
zinc	yes

Figure 18

Explain these results by referring to the structures of the substances.

(6)

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(Total for question = 6 marks)

(**Q06c 1SC0/1CF, SAM 2016**)

Q36.

A student used the equipment in Figure 2 to investigate whether electricity can pass through solid ammonium chloride and through ammonium chloride solution.

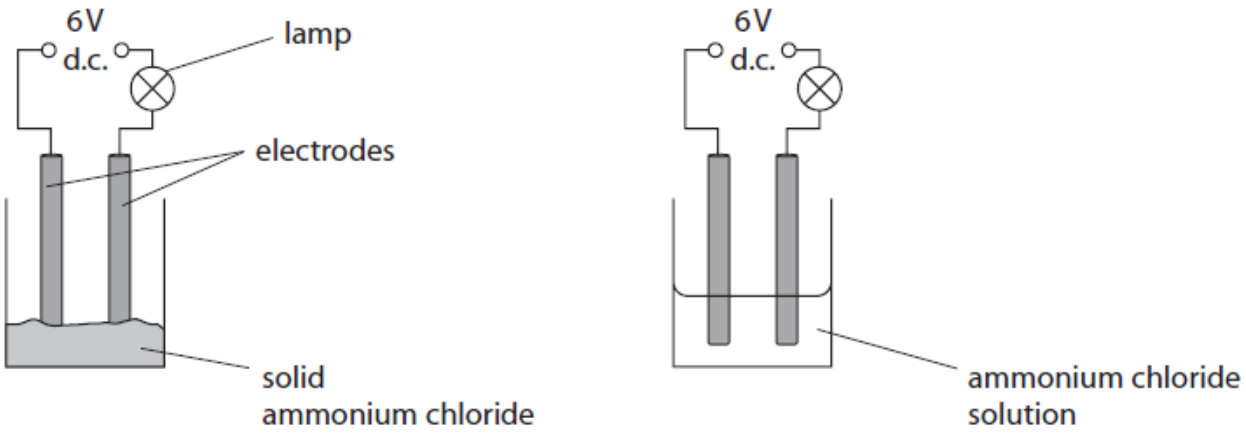


Figure 2

If an electrical current flows in the circuit, the lamp will light up.

Figure 3 shows the results of the investigation.

substance	lamp
solid ammonium chloride	did not light up
ammonium chloride solution	lit up brightly

Figure 3

Explain the results of the investigation.

(3)

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(Total for question = 3 marks)

(**Q01c 1SC0/2CH, Nov 2021**)

Q37.

A student used the equipment in Figure 11 to investigate whether electricity can pass through solid ammonium chloride and through ammonium chloride solution.

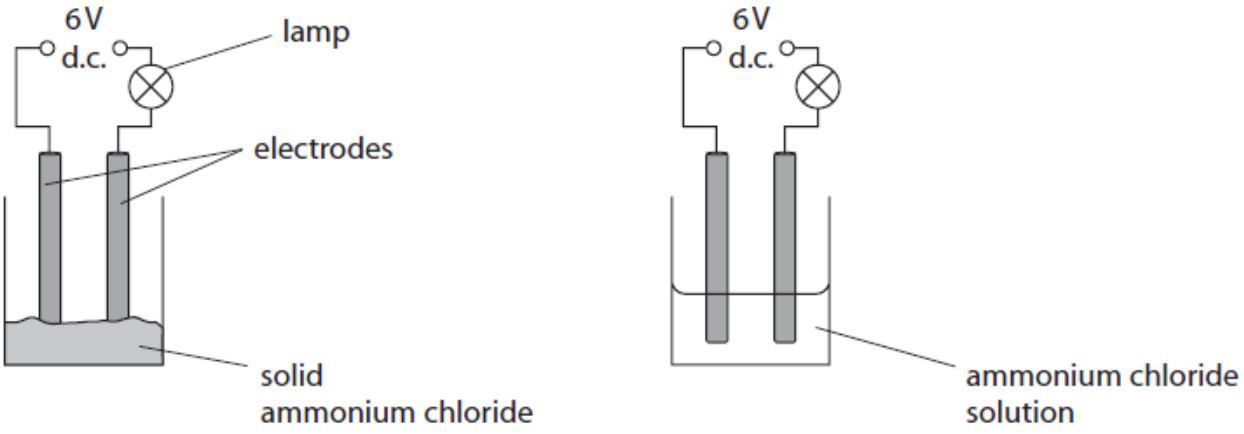


Figure 11

If an electrical current flows in the circuit, the lamp will light up.

Figure 12 shows the results of the investigation.

substance	lamp
solid ammonium chloride	did not light up
ammonium chloride solution	lit up brightly

Figure 12

Explain the results of the investigation.

(3)

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(Total for question = 3 marks)

(**Q05c 1SC0/2CF, Nov 2021**)

Q38.

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)

(**Q03c 1SC0/1CF, SAM**)

Q39.

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

Barium has a melting point of 714 °C.

Explain, in terms of structure and bonding, why barium has a high melting point.

(3)

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(Total for question = 3 marks)

(**Q04c 1SC0/1CH, SAM**)

Q40.

Carbon dioxide is a simple molecular, covalent compound.

It has a low boiling point of –78.5 °C.

Explain why carbon dioxide has a low boiling point.

(2)

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(Total for question = 2 marks)

(**Q03b 1SC0/2CH, June 2019**)