Pearson Edexcel

Additional Assessment Materials Summer 2021

Pearson Edexcel GCSE in Chemistry (1CH0) Foundation

Resource Set Topic B: Bonding and Structure

Questions

(Public release version)

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Additional Assessment Materials, Summer 2021

General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

4d-e

(d) Substance X is a gas at room temperature.
It is a simple molecular, covalent substance.

Which row of the table shows the properties that substance X is most likely to have?

(1)

	boiling point in °C	relative solubility in water
☒ **A**	–6	low
☒ **B**	600	high
☒ **C**	–6	high
☒ **D**	600	low

(e) Diamond has a giant covalent structure.

State one property of diamond that is the result of its giant covalent structure.

(1)

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5 Two compounds of barium are barium sulfide and barium chloride.

(a) The hazard symbol shown in Figure 5 is on bottles containing barium metal.

Figure 5

State the meaning of this hazard symbol.

(1)

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(b) Give the names of the elements combined in barium sulfide.

(1)

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.....

(c) Barium chloride is toxic.

Explain one safety precaution that should be taken when using barium chloride.

(2)

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8 (a) State **two** characteristic properties of metals.

(2)

property 1 .....

property 2 .....

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

(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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.....

8.

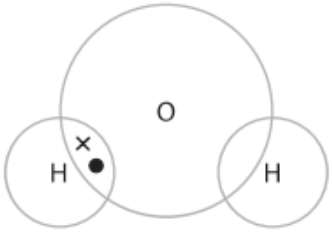
(e) An oxygen atom has six electrons in its outer shell.

A hydrogen atom has one electron in its outer shell.

Complete the dot and cross diagram of a molecule of water, H_2O.

Show outer shell electrons only.

(2)



1biii

(iii) Hydrogen has one electron in its electron shell.
Figure 2 shows the incomplete dot and cross diagram of a hydrogen molecule.

Complete Figure 2 to show the electrons in the covalent bond between the two atoms of hydrogen.

(1)

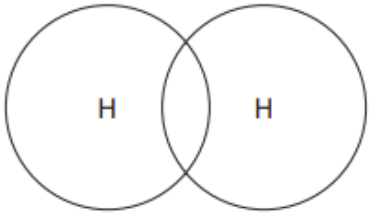


Figure 2

4e

(e) Gallium metal is a conductor of electricity.

Explain how metals conduct electricity.

(2)

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8c

(c) The ions present in sodium sulfate are

sodium	Na^+
sulfate	SO_4^{2-}

Write the formula of sodium sulfate using this information.

(1)

.....

8c

(c) 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)

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

(2)

9 (a) An aluminium atom has the atomic number 13 and the mass number 27.

Which row shows the numbers of subatomic particles present in an aluminium ion, Al^{3+}?

(1)

	protons	neutrons	electrons
☒ **A**	13	14	13
☒ **B**	13	14	10
☒ **C**	14	13	10
☒ **D**	14	13	17

*(d) Sodium chloride is an ionic compound, containing sodium ions, Na^+, and chloride ions, Cl^-.

Figure 15 shows the electronic configuration of sodium and chlorine.

	electron configuration
sodium	2.8.1
chlorine	2.8.7

Figure 15

Explain how sodium and chlorine atoms form the ions in sodium chloride and how the ions are arranged in the solid sodium chloride.

You may wish to use diagrams in your answer.

(6)

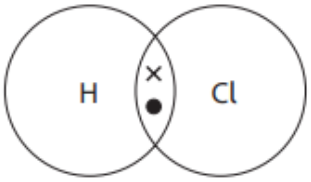
5 Chlorine, bromine and iodine are elements in group 7 of the periodic table.

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

(iii) A chlorine atom has seven electrons in its outer shell.
A hydrogen atom has one electron in its outer shell.

Complete the dot and cross diagram of a molecule of hydrogen chloride.
Show outer shell electrons only.

(1)



(iv) Name the type of bonding in a molecule of hydrogen chloride.

(1)

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(d) Figure 8 shows apparatus used to find out if a solution conducts electricity.

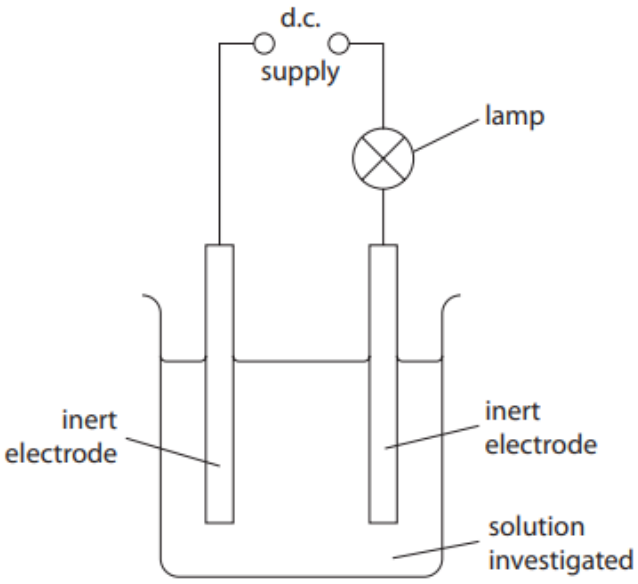

Figure 8

Glucose solution and sodium chloride solution are tested.
Glucose is a typical simple molecular covalent compound.
Sodium chloride is an ionic compound.

(i) State what would happen to the lamp when glucose solution is tested.

(1)

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.....

(ii) State what would happen to the lamp when sodium chloride solution is tested.

(1)

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(e) Figure 9 shows how the conductivity of one solution changes as its concentration increases.

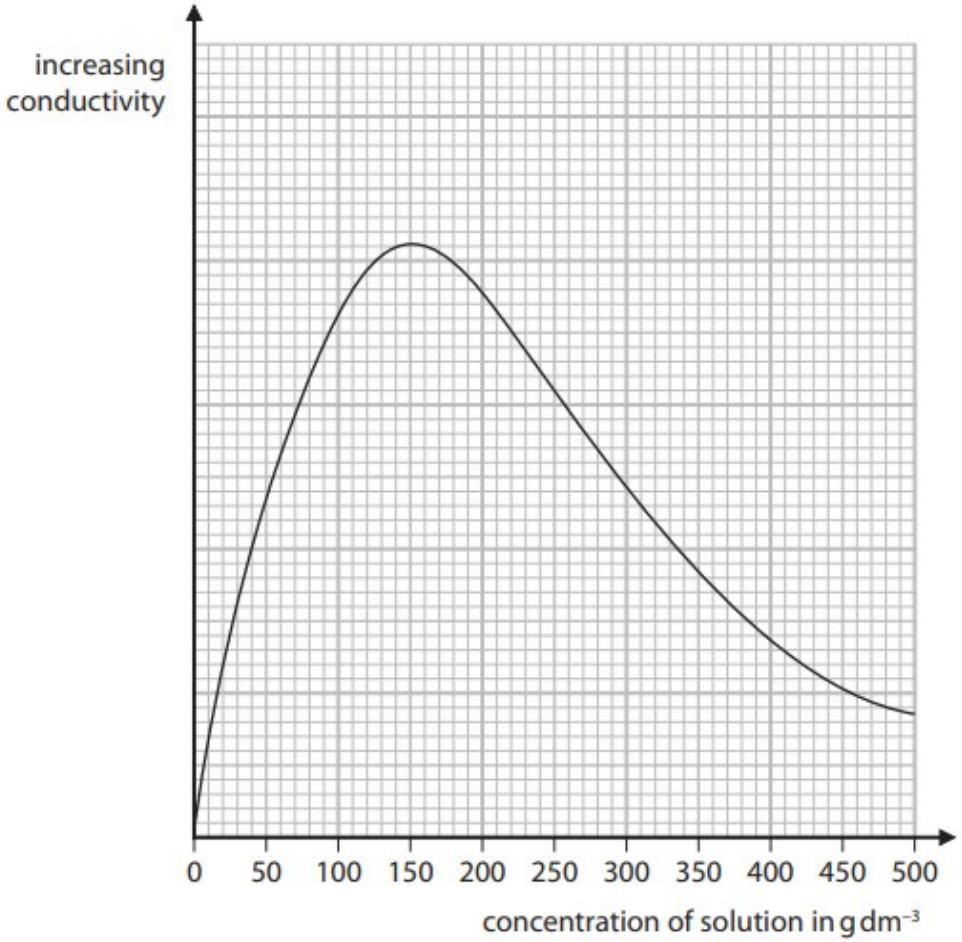

Figure 9

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

(2)

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8 (a) An atom of potassium has atomic number 19 and mass number 39.

(i) Give the electronic configuration of this potassium atom.

(1)

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(ii) This potassium atom forms the ion K^+.

Which row shows the number of protons and the number of neutrons in this potassium ion, K^+?

(1)

	number of protons	number of neutrons
☒ **A**	19	19
☒ **B**	19	20
☒ **C**	20	19
☒ **D**	20	20

(c) Fluorine boils at –188 °C.
There are forces between fluorine molecules.

Explain, in terms of these forces, why the boiling point of fluorine is low.

(2)

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TOTAL FOR PAPER IS 37 MARKS