

**A Level Chemistry**

**Transition Work**

1. To prepare you for the first year of A’ level chemistry, ideally you should work through ‘Head Start to AS Chemistry’ by David Mason

ISBN: 978 1 78294 2801



Available from Amazon and other booksellers

for approximately £5.

Read each section then answer questions.

Check and correct answers before moving onto the next section.

1. As a minimum **(for your first homework)** you should answer the following exam style questions. The questions are higher tier GCSE chemistry questions and are relevant to the topics covered at A’ level during the first term. **You must bring your answers along to your first chemistry lesson in September.**
2. The Text book for the course can be ordered through the College when you start in September, If you wish to purchase it before then the details are given below:

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| Edexcel A’ Level Chemistry 1By Graham Curtis, Andrew Hunt and Graham HillISBN 978-1-4718-0746-6 | Product Details |

**Homework Questions**

The following questions would take about 1 hour under test conditions.

However, **this is not a test, it is revision!**

* Please use your GCSE notes, ‘Head start’ or a GCSE revision guide to help.
* Take however long you need to remind yourself how to tackle these types of question!
* It may therefore take 2-3 hours to do properly.
* Please complete the table below and attempt all questions.

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| **Name** | **GCSE Grades:**  |
|  | Maths | Chemistry OR Science | Physics OR Additional Science | Biology ORN/A |
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**Q1.**

Chlorine is an element in group 7 of the periodic table.

Chlorine, Cl2, is a simple molecular, covalent substance.

The atoms in a molecule of chlorine are held together by a covalent bond.

(i)  Explain what is meant by the term **covalent bond**.

**(2)**

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(ii)  Phosphorus reacts with chlorine to form phosphorus trichloride, PCl3.

A phosphorus atom has five electrons in its outer shell.

A chlorine atom has seven electrons in its outer shell.

Draw the dot and cross diagram to show the bonding in a molecule of phosphorus trichloride, PCl3.

Show outer electrons only.

**(2)**

(iii)  Aluminium reacts with chlorine to form aluminium chloride, AlCl3.

Write the balanced equation for this reaction.

**(2)**

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**(Total for question = 6 marks)**

**Q2.**

An atom of copper has an atomic number of 29 and a mass number of 63.

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

**(2)**



(ii)  Copper is in period 4 of the periodic table.

State what information this gives about the number of shells that contain electrons, in a copper atom.

**(1)**

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(iii)  Copper exists as isotopes.

Explain what is meant by the term **isotopes**.

**(2)**

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(iv)  A sample of copper contains

70% of copper-63 atoms and

30% of copper-65 atoms.

Use this information to calculate the relative atomic mass of copper in this sample.

**(3)**

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relative atomic mass of copper = ...........................................................

**Q3.**

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



(i) Which particle is a negatively charged ion?

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

**(1)**

    **A**   P

    **B**   S

    **C**   T

    **D**   V

(ii) Which particles are atoms of metals?

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

**(1)**

    **A**   P and R

    **B**   Q and R

    **C**   Q and S

    **D**   Q, S and V

(b) Each element has an atomic number.

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

**(1)**

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 (ii) The atomic number of boron is 5.
       Boron exists as two isotopes boron-10 and boron-11.

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

**(2)**

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

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 (ii) A sample of boron contains
      19.7% of boron-10.
      80.3% of boron-11.

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

**(3)**

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 **(Total for Question = 10 marks)**

**Q4.**

The atomic number of carbon is 6.

The atomic number of hydrogen is 1.

Draw a dot and cross diagram of a molecule of methane, CH4.

Show the outer shell electrons only.

**(2)**

**Q5.**

Marble chips react with dilute hydrochloric acid.

Marble is a form of calcium carbonate.

(i)  Complete the balanced equation for this reaction.

**(2)**



(ii)  Explain how using smaller sized marble chips affects the rate of this reaction, when all the other conditions remain the same.

**(2)**

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(iii)  Explain, in terms of collisions between particles, how increasing the concentration of the hydrochloric acid affects the rate of this reaction, when all the other conditions remain the same.

**(2)**

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**(Total for question = 6 marks)**

**Q6.**

(i)  When calcium carbonate is heated, it breaks down to form calcium oxide and carbon dioxide.

What type of reaction is this?

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

**(1)**

   **A**    combustion

   **B**    decomposition

   **C**    oxidation

   **D**    precipitation

(ii)  Calcium oxide reacts with water to form calcium hydroxide, Ca(OH)2.

Write the balanced equation for the reaction between calcium oxide and water.

**(2)**

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**(Total for question = 3 marks)**

**Q7.**

In the extraction of titanium from its ore, the final stage involves the reaction between titanium(IV) chloride, TiCl4, and sodium.

TiCl4 + 4Na → Ti + 4NaCl

Calculate the maximum mass of titanium that can be obtained from 500 tonnes of titanium(IV) chloride in this reaction.

(relative atomic mass: Ti = 48
relative formula mass of TiCl4 = 190)

**(2)**

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 mass of titanium = ........................................................... tonnes

**(Total for question = 2 marks)**

**Q8.**

Calculate the percentage by mass of nitrogen in ammonium nitrate, NH4NO3.

(relative atomic masses: H = 1.0, N = 14, O = 16)

**(3)**

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 percentage by mass of nitrogen = ........................................................... %

**(Total for question = 3 marks)**

**Q9.**

When nitrogen and hydrogen react to form ammonia, the reaction can reach a dynamic equilibrium.



    (i) Calculate the minimum volume of hydrogen required to completely convert 1000 dm3 of nitrogen into ammonia.

**(1)**

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volume of hydrogen =. . . . . . . . . . . . . . . . . .dm3

 (ii) Ammonia is reacted with excess nitric acid, HNO3, to make ammonium nitrate, NH4NO3.

NH3 + HNO3 → NH4NO3

Calculate the mass of ammonium nitrate produced by the complete reaction of 34 g of ammonia.

(Relative atomic masses H = 1.0, N = 14, O = 16)

**(3)**

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mass of ammonium nitrate produced =. . . . . . . . . . . . . . . . .g

**Q10.**

In an experiment, 3.1 g of phosphorus reacted with 24 g of bromine to form phosphorus bromide.

Calculate the empirical formula of the phosphorus bromide.

You must show your working.

(relative atomic masses: P = 31, Br = 80)

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empirical formula ...........................................................

**Q11.**

Copper nitrate contains copper ions, Cu2+, and nitrate ions, .

(i)  Describe, in terms of electrons, how a copper atom, Cu, becomes a copper ion, Cu2+.

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(ii)  Write the formula for copper nitrate.

**(1)**

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**Q12.**

Aluminium ions, Al3+, react with hydroxide ions in solution to give a white precipitate of aluminium hydroxide.

Write the ionic equation for this reaction.

**(3)**

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**Q13.**

(a)  The halogens react with hydrogen to form hydrogen halides.

Complete the balanced equation for the reaction between hydrogen and bromine forming hydrogen bromide.

**(2)**

H2 + Br2 → ...........................................................

(b)  Calculate the relative formula mass of magnesium chloride, MgCl2.
(relative atomic masses: Mg = 24.0; Cl = 35.5)

**(1)**

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relative formula mass = ...........................................................

(c)  Calculate the percentage by mass of fluorine in sodium fluoride, NaF.
(relative atomic masses: F = 19; Na = 23)

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percentage by mass of fluorine = ...........................................................