

Transition tasks for new year 12 students – KEVICC CHEMISTRY

These are designed to give you something worthwhile to do over the summer (so that you don't forget everything you learnt at GCSE!) and give us, as teachers, an idea of your strengths and areas for development. Please hand these tasks in at the start of your first A-level Chemistry lesson.

First task

Explain the development of our understanding of atomic structure in one of the following ways:

- Video / animation
- Poster
- Presentation
- Essay

Scientists to consider discussing:

Democritus

John Dalton

JJ Thomson

RA Millikan

Ernest Rutherford

Henry Moseley

James Chadwick

(please feel free to discuss other scientists)

This task is meant to be very open ended and could take anything from 2 hours to 2 weeks to complete.

Second task

There are 8 extended answer questions on the next two pages, these should take you under an hour to complete. You are welcome to use books/internet etc... to help you answer them.

Questions

Q1.

Explain the difference in the ability of solid sodium chloride and molten sodium chloride to conduct electricity in terms of their structures.

Q2.

Some processes add carbon dioxide to today's atmosphere.
Other processes remove carbon dioxide from the atmosphere.
As a result, the amount of carbon dioxide in the atmosphere can change.
Explain how carbon dioxide is added to and removed from today's atmosphere.

Q3.

An experiment was carried out to compare the rates of reaction between calcium carbonate and two different concentrations of hydrochloric acid.
Describe, in detail, how you would carry out this experiment.

Q4.

Metals have specific uses based on their properties.
The table shows some properties of four metals.

metal	cost of 1 kg / £	density / g cm ⁻³	relative strength	resistance to corrosion	electrical conductivity
aluminium	1	2.70	high	good	good
copper	5	8.92	high	good	very good
gold	33000	19.3	low	excellent	excellent
silver	620	10.5	low	very good	excellent

Use the data in the table to explain some uses of each of these metals in relation to their individual properties.

Q5.

Lithium, sodium and potassium all react with cold water.

Sodium and potassium react with cold water to give similar products.

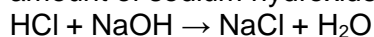
The electronic configuration of sodium is 2.8.1.

The electronic configuration of potassium is 2.8.8.1.

Explain the similarities and differences in the way sodium and potassium react with cold water by considering their reactions and their electronic configurations.

Q6.

Titration can be used to determine the exact amount of hydrochloric acid that reacts with a given amount of sodium hydroxide solution.



Sodium chloride solution can be made from dilute hydrochloric acid and sodium hydroxide solution.

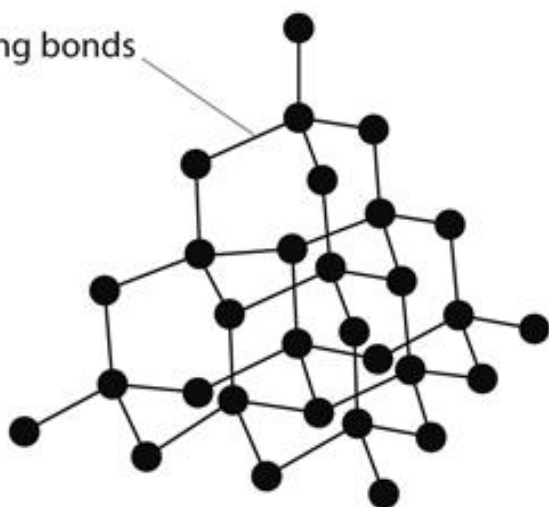
Describe a titration experiment to find the exact volume of hydrochloric acid needed to neutralise 25.0 cm³ of sodium hydroxide solution and how you would use this result to obtain pure, dry crystals of sodium chloride.

Q7.

The diagrams show the structures of two forms of carbon, diamond and graphite.

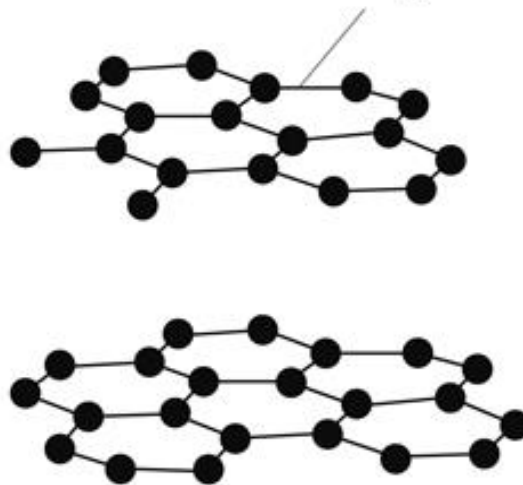
● = carbon atom

strong bonds



diamond

strong bonds



graphite

Use the diagrams of the structures of diamond and graphite to help you explain why graphite conducts electricity but diamond does not conduct electricity.

Q8.

Magnesium has an electronic configuration of 2.8.2.

Oxygen has an electronic configuration of 2.6.

Explain, in terms of their electronic configurations, how magnesium and oxygen atoms react to form the ionic compound magnesium oxide, MgO, and include a description of the structure of solid magnesium oxide.