

# Y11 into Y12 Summer Work 2019 - A level Chemistry

Complete the following on lined paper. You should complete every question in **DETAIL**, or you will be required to redo this work. Anything you are not sure about – look it up 😊 - rather than leave it blank! We are not only looking to see what you already know, but also how proactive and independent you can be in finding and interpreting information yourself. It is vital you have these skills to be successful in A level Chemistry.

Hint: 'Chemguide' is a good website for help if you are stuck.

**YOU MUST BRING THIS COMPLETED WORK TO YOUR FIRST CHEMISTRY LESSON.**

1. **Draw** the common hazard symbols
2. **Describe** the following mathematical concepts, with an example of each;
  - a. Significant figures
  - b. Range
  - c. Mean
  - d. Uncertainty
  - e. Percentage uncertainty
3. **Draw** and label diagrams for the following laboratory methods. Next to each one, **explain the purpose and how it works**, in **detail**. Give an **example** of when this method is used.
  - a. Filtration (both gravity and vacuum)
  - b. Crystallisation
  - c. Titration
  - d. Distillation
  - e. Reflux
  - f. Thin-layer chromatography
  - g. Melting point apparatus
  - h. Calorimetry (to measure enthalpy of combustion)
  - i. Measuring volumes of gases (3 methods)
  - j. Making a soluble salt
  - k. Making an insoluble salt
4. **Explain the calculation** you would do to work out an unknown concentration of acid using an alkali using a titration experiment.
5. What is the **difference** between a compound, molecule, element and atom?
6. **Draw and label** the structure of an atom, stating the **masses and charges** of all sub-atomic particles.
7. Why are atoms neutral?
8. Explain the term 'isotope' and **give examples** of known isotopes.
9. **Draw the dot-cross diagrams** to show the bonding for the following formulae. You will need to decide if they are covalent, metallic or ionic to do this.
  - a. Chlorine
  - b. Lithium bromide
  - c. Sodium oxide
  - d. Methane
  - e. Ammonia
  - f. Potassium
  - g. Aluminium oxide
  - h. Iron (II) oxide
10. **Compare** the similarities and differences in structure and properties between copper (II) oxide, water and magnesium.
11. Define each type of reaction below;
  - a. Reduction
  - b. Oxidation

- c. Addition
  - d. Substitution
  - e. Elimination
  - f. Dehydration
  - g. Hydration
  - h. Displacement
  - i. Thermal decomposition
  - j. Condensation reaction
  - k. Hydrolysis
12. **Explain** the electrolysis of aqueous lead bromide, in detail. Ensure to **state and explain the equations** for the half reactions at the electrodes.
13. **Explain** what a mole is and **give the equation** linking mass to moles.
- a. How many moles in 56.6g of carbon dioxide?
  - b. How many moles in 345.7kg of sodium chloride?
  - c. What is the mass of 23 moles of molecular bromine?
  - d. A compound has the formula  $\text{FeCl}_x$ . There is 815g of the compound, and 5 moles of it. What is the value of x?
14. In a reaction, 34g of methane are combusted. **Write the balanced symbol equation** for this reaction and using this, **work out the mass** of carbon dioxide produced.
15. Hydrogen peroxide can be decomposed. Write the balanced symbol equation for this and find out the **starting mass of hydrogen peroxide** if 9.34g of oxygen is produced.
16. What is the percentage by mass of;
- a. Nitrogen in  $\text{HNO}_3$ ?
  - b. Carbon in  $\text{C}_3\text{H}_5\text{OH}$ ?
  - c. Fluorine in  $\text{C}_{13}\text{H}_{12}\text{F}_2\text{N}_6\text{O}$ ?
  - d. Oxygen in  $\text{UO}_2\text{SO}_4$ ?
  - e. Hydrogen in  $\text{Zn}(\text{C}_8\text{H}_{15}\text{O}_2)_2$ ?
17. 19% by mass of a 1.5kg ore of cuprite contains copper oxide. What is the mass of copper that can be extracted from the ore?
18. What is a homologous group?
19. **Draw** out the displayed formulae (using a line for every bond) for the first five alkanes, alkenes and alcohols. **State the molecular formulae** next to each one, and the **overall general formulae of each homologous group**.
20. Describe, with the aid of a diagram, how a time-of-flight mass spectrometer works. **Explain** what the **purpose** of mass spectrometry is and **the information you can obtain** from a mass spectrum.
21. **Explain** collision theory and **use this** to explain how rate is affected by;
- a. An increase from  $34^\circ\text{C}$  to  $43^\circ\text{C}$
  - b. The removal of a catalyst from the reaction mixture
  - c. An increase of pressure from 5atm to 10atm
  - d. A decrease in concentration from 6M to 2M
  - e. Using one singular 30g lump of iron opposed to 30g of iron filings
22. Make a list of your strengths/weaknesses in chemistry in reflection of this piece of work.

See you in September 😊