

Bridging the gap between GCSE and AS level.

Make notes on the topics covered at GCSE as they will be built upon.

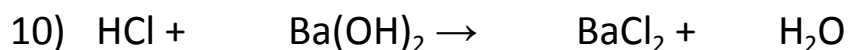
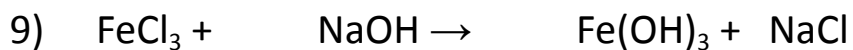
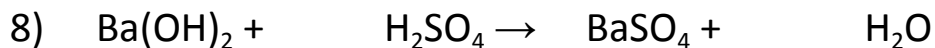
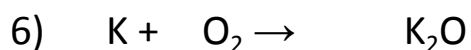
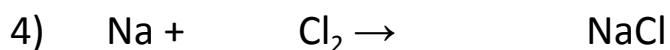
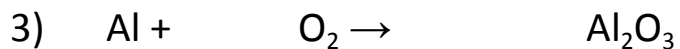
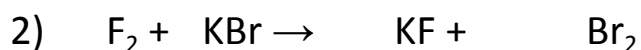
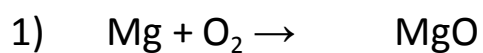
It is recommended you do one set of Edexcel GCSE past paper (paper 1+2), these can be found on the Edexcel website or physics and maths tutor.

Please complete all the questions below.

## Atomic Number, Mass Number, Ions & Isotopes

Element or ion	Symbol/Formula	Z	A	Protons	Electrons	Neutrons
Sodium						
		6	12			
		12				12
Chlorine		17	35			
Chlorine		17	37			
Lithium ion						
Chloride			35			

Balance the following equations



## Chemical Calculations

1) a) Calculate the Mr of: i)  $\text{Br}_2$  ii)  $\text{K}_2\text{CO}_3$  iii)  $(\text{NH}_4)_2\text{SO}_4$

b) Calculate the percentage of oxygen in  $\text{K}_2\text{CO}_3$ .

2) a) Define the terms empirical formula and molecular formula.

b) A hydrocarbon was found to contain 82.8% by mass of carbon. It has an Mr of 58. Find the empirical and molecular formulas of this compound.

c) 1 g of sulphur was burned forming 2.5 g of an oxide. Find the empirical formula of the oxide.

3) What mass of calcium oxide is formed from the decomposition of 180 g of calcium carbonate?  $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$

## Structure and Bonding

1) Explain each of the following about melting and boiling points:

a) Simple molecular substances have low melting and boiling points.

b) Giant covalent substances have very high melting and boiling point.

c) Ionic substances have high melting and boiling points.

d) Metals have quite high melting and boiling points.

2) Explain each of the following about electrical conductivity:

a) Simple molecular substances do not conduct at all.

b) Giant covalent substances do not conduct, apart from graphite.

c) Ionic substances conduct when melted or dissolved, but not when solid.

d) Metals conduct as solids and when melted.

What type of Structure is it?

	Melting point (°C)	Boiling point (°C)	Electrical conductivity as solid	Electrical conductivity as liquid	Electrical conductivity as aqueous solution	Type of Structure (simple or giant) & Bonding (covalent, ionic or metallic)
A	55	121	Poor	Poor	Poor	
B	402	568	Good	Good	Not soluble	
C	-211	-194	Poor	Poor	Poor	
D	1610	2230	Poor	Poor	Not soluble	
E	618	877	Poor	Good	good	
F	3725	4825	Good		Not soluble	
G	54	340	Good	Good	Good	
H	932	1567	Poor	Good	Insoluble	
I	-103	-41	Poor	poor	Poor	

Ionic Formula –Work out the ionic formula of the following:

1. silver nitrate
2. iron (III) hydroxide
3. ammonium chloride
4. lithium oxide
5. copper carbonate
6. sodium sulphate
7. iron (II) sulphate
8. calcium hydroxide

Positive ions	Negative ions
Silver, $\text{Ag}^+$	Nitrate $\text{NO}_3^-$
Ammonium, $\text{NH}_4^+$	Hydroxide $\text{OH}^-$
Lithium, $\text{Li}^+$	Chloride $\text{Cl}^-$
Sodium, $\text{Na}^+$	Oxide $\text{O}^{2-}$
Copper, $\text{Cu}^{2+}$	Carbonate $\text{CO}_3^{2-}$
Calcium, $\text{Ca}^{2+}$	Sulphate $\text{SO}_4^{2-}$
Iron (II), $\text{Fe}^{2+}$	
Iron (III), $\text{Fe}^{3+}$	

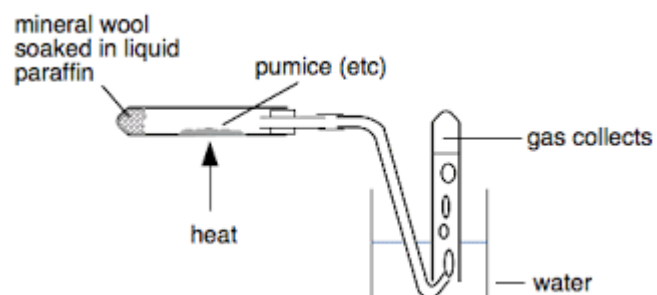
## Crude Oil

The alkanes are a homologous series of saturated hydrocarbons.

- a) What is a hydrocarbon?
- b) What is a homologous series?
- c) What is meant by the word saturated in this context?
- d) Draw the structure of propane.
- e) Octane is a straight chain alkane containing eight carbon atoms.
  - i) Write its molecular formula.
  - ii) Draw its structural formula.
- f) Write a balanced equation for the complete combustion of propane.
- g) Write a balanced equation for the incomplete combustion of propane, where a toxic gas is formed.

## Cracking

Cracking is a thermal decomposition reaction. Define thermal decomposition.



- 1) What is produced when long alkanes are cracked and explain they are cracked.
- 2) Why is the porous pot used in Cracking?
- 3) Why would “suck back” have happened if the tube had not been removed at the end?
- 4) What happened when bromine water was added to the tube of gas collected?

## Polymers

Monomer	Structure	polymer	Structure
Ethene	$\begin{array}{c} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C}=\text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array}$	Poly(ethene)	$\left( \begin{array}{cc} \text{H} & \text{H} \\   &   \\ -\text{C} & -\text{C}- \\   &   \\ \text{H} & \text{H} \end{array} \right)_n$
Propene	$\begin{array}{c} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C}=\text{C} \\ & / & \diagdown \\ \text{H} & & \text{CH}_3 \end{array}$	<b>A</b>	<b>B</b>
<b>C</b>	<b>D</b>	Poly(tetrafluoroethene)	$\left( \begin{array}{cc} \text{F} & \text{F} \\   &   \\ -\text{C} & -\text{C}- \\   &   \\ \text{F} & \text{F} \end{array} \right)_n$

1. Complete the table above
2. What is meant by the term 'Monomer'?
3. What is meant by the term 'Polymer'?
4. What is the formula of tetrafluoroethane?
5. What feature allows these molecules to be polymerised?

## Titration

1. A solution of hydrochloric acid (HCl) has a concentration of 1.50 mol per  $\text{dm}^3$ . Calculate its concentration in grams per  $\text{dm}^3$ . (3 marks)

2.  $0.0350 \text{ dm}^3$  of sodium hydroxide (NaOH) solution was put in a flask. The concentration of the sodium hydroxide was  $0.500 \text{ mol/dm}^3$ .  $0.0250 \text{ dm}^3$  of hydrochloric acid (HCl) was needed to neutralise it.

a. Calculate the number of moles of sodium hydroxide used. (1 mark)

b. How many moles of acid were needed to neutralise the NaOH? (1 mark)

c. Calculate the concentration of the hydrochloric acid in  $\text{mol/dm}^3$  (1 mark)

3.  $25.0 \text{ cm}^3$  of sodium hydroxide (NaOH) solution was neutralised by  $37.5 \text{ cm}^3$  of hydrochloric acid (HCl). The concentration of the sodium hydroxide was  $0.750 \text{ mol/dm}^3$ .

a. Calculate the number of moles of sodium hydroxide used. (2 marks)

b. How many moles of acid were needed to neutralise the NaOH? (2 marks)

c. Calculate the concentration of the hydrochloric acid in  $\text{mol/dm}^3$ . (2 marks)

4.  $27.5 \text{ cm}^3$  of sulfuric acid ( $\text{H}_2\text{SO}_4$ ) was needed to neutralise  $20.0 \text{ cm}^3$  of sodium hydroxide (NaOH) solution. The concentration of the sodium hydroxide was  $1.00 \text{ mol/dm}^3$ . Calculate the concentration of the acid used in  $\text{mol/dm}^3$ . (4 marks)

5. 25.0 cm<sup>3</sup> of nitric acid (HNO<sub>3</sub>) was neutralised by 43.7 cm<sup>3</sup> of sodium hydroxide (NaOH) solution. The concentration of the nitric acid was 0.500 mol/dm<sup>3</sup>.

a. Calculate the concentration of the sodium hydroxide in mol/dm<sup>3</sup>. (5 marks)

b. Calculate the concentration of the sodium hydroxide in g/dm<sup>3</sup>. (3 marks)

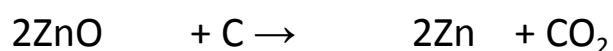
### REDOX

1) What is "redox"?

2) What does oxidation mean?

3) What does reduction mean?

4) Which element is oxidised and which is reduced in the reaction below?



Oxidised ..... Reduced .....