



OCR A GCSE Chemistry

Topic 3: Chemical reactions

Types of chemical reactions

Notes





C3.3a explain reduction and oxidation in terms of loss or gain of oxygen, identifying which species are oxidised and which are reduced

- Oxidation is gain of oxygen, reduction is loss of oxygen
 - E.g. ethanol (OH) can be oxidised to form ethanoic acid (COOH), gaining oxygen

C3.3b (HT only) explain reduction and oxidation in terms of gain or loss of electrons, identifying which species are oxidised and which are reduced

- Try and remember this phrase: OIL RIG, it stands for Oxidation Is Loss and Reduction Is Gain (of electrons)



C3.3c recall that acids form hydrogen ions when they dissolve in water and solutions of alkalis contain hydroxide ions

- when acids dissolve in water, H⁺ ions are released
- when alkalis dissolve in water, they release OH⁻ ions

C3.3d describe neutralisation as...

- Acid reacting with alkali or a base to form a salt plus water

C3.3e recognise that aqueous neutralisation reactions can be generalised to...



- this is the ionic equation for any reaction of an acid with an alkali (soluble base)





C3.3f recall that carbonates and some metals react with acids and write balanced equations predicting products from given reactants



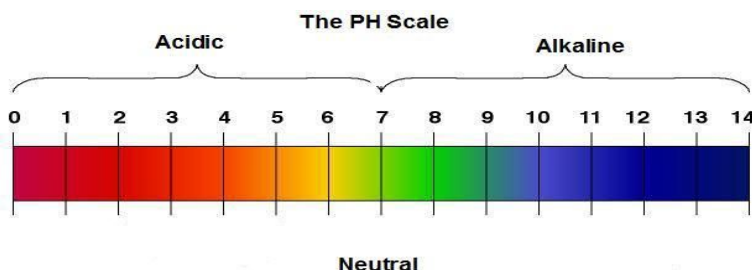
- The salt produced...
 - o Depends on the acid used...
 - Hydrochloric acid produces chlorides
 - Nitric acid produces nitrates
 - Sulfuric acid produces sulfates
 - o It also depends on the positive ions in the base i.e. the metal, which makes up the first part of the name

C3.3g (HT only) use and explain the terms dilute and concentrated (amount of substance) and weak and strong (degree of ionisation) in relation to acids

- Strong acid = completely ionised in aqueous solution (ionised means releasing ions(H^+))
 - o Hydrochloric, nitric and sulfuric acids
- Weak acid = partially ionised in aqueous solution
 - o Ethanoic, citric and carbonic acids
- Stronger an acid, lower the pH (for a given conc. of aq. solutions)
- As the pH decreases by one unit, the H^+ conc. of the solution increases by a factor of 10.
- Strong and weak is NOT the same as concentrated and dilute – the latter refers to the amount of substance in a given volume whereas, the former refers to the above – the H^+ ion conc. in aq. solutions

C3.3h recall that relative acidity and alkalinity are measured by pH

- The pH scale (0 to 14) measures the acidity or alkalinity of a solution, and can be measured using universal indicator or a pH probe
 - o pH 7 is neutral
 - o $<$ pH 7 is acidic
 - o $>$ pH 7 is alkaline





C3.3i (HT only) describe neutrality and relative acidity and alkalinity in terms of the effect of the concentration of hydrogen ions on the numerical value of pH (whole numbers only)

- stronger the acid, the closer the pH value is to 0
- stronger the alkali, the closer the pH value is to 14
- a larger concentration of H^+ ions gives a more acidic pH value so

C3.3j (HT only) recall that as hydrogen ion concentration increases by a factor of ten the pH value of a solution decreases by a factor of one

C3.3k describe techniques and apparatus used to measure the pH

- pH meter- gives an exact pH value
- universal indicator- changes colour which can be compared to the pH scale
- Indicators
 - o Methyl orange
 - Acidic = red
 - Neutral = yellow
 - Alkaline = yellow
 - o Phenolphthalein
 - Acidic = colourless
 - Neutral = colourless
 - Alkaline = pink
 - o Litmus
 - Red litmus
 - Acidic = red
 - Neutral = red
 - Alkaline = blue
 - Blue litmus
 - Acidic = red
 - Neutral = blue
 - Alkaline = blue

