EDEXCEL TOPIC 5: Separate Chemistry 1

Dynamic equilibria

Changing concentration	If the concentration of a reactant is increased, more products will be formed . If the concentration of a product is decreased, more reactants will react.
Changing temperature	If the temperature of a system at equilibrium is increased: - Exothermic reaction = products decrease - Endothermic reaction = products increase
Changing pressure (gaseous reactions)	For a gaseous system at equilibrium: - Pressure increase = equilibrium position shifts to side of equation with smaller number of molecules. - Pressure decrease = equilibrium position shifts to side of equation with larger number of molecules.

The Haber process

The Haber process	This process uses nitrogen from the air and hydrogen from natural gas to form ammonia. The reaction is reversible and uses optimum conditions and a catalyst in order to reach dynamic equilibrium.
Optimum conditions	The optimum temperature for the Haber process is 450°C and optimum pressure is 200 atmospheres. These are economically viable conditions as they produce the best yield to cost ratio.

Fertilisers

NPK fertilisers	***These contain nitrogen, phosphorous and potassium***	Formulations of various salts containing appropriate percentages of the elements.
Fertiliser examples	***Potassium chloride, potassium sulfate and phosphate rock are obtained by mining***	Phosphate rock needs to be treated with an acid to produce a soluble salt which is then used as a fertiliser. Ammonia can be used to manufacture ammonium salts and nitric acid.

Properties and uses of metals

Metal	*Properties*	Uses
Aluminium	***Low density (lightweight), layer of oxides at surface (corrosion resistant)***	**Aluminium cans, cooking foil, saucepans.**
Copper	***Good electrical and thermal conductor, flexible***	**Saucepans, electrical wiring.**
Gold	***Unreactive***	**Jewellery, coins.**

Magnalium (Aluminium and magnesium alloy)	**Aircraft and car parts.**
Brass (copper and zinc alloy)	**Used in electrical fittings.**

Oxidation

Corrosion	***The destruction of materials by chemical reactions with substances in the environment***	**An example of this is iron rusting; iron reacts with oxygen from the air to form iron oxide (rust) water needs to be present for iron to rust.**
Preventing corrosion	***Coatings can be added to metals to act as a barrier***	**Examples of this are greasing, painting and electroplating. Aluminium has an oxide coating that protects the metal from further corrosion.**
Sacrificial corrosion	***When a more reactive metal is used to coat a less reactive metal***	**This means that the coating will react with the air and not the underlying metal. An example of this is zinc used to galvanise iron.**
Electroplating	***Used to improve the appearance and/or resistance to corrosion***	**Electrolysis is used to reduce metal cations so they form a thin layer at the cathode.**

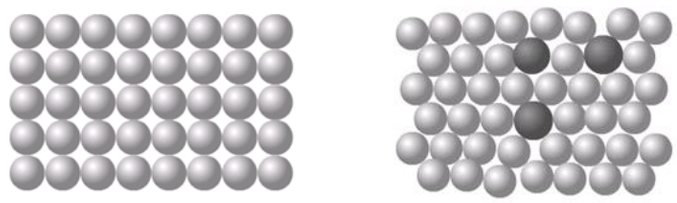
Transition metals, alloys and corrosion

Properties of metals and alloys

High melting and boiling points	**This is due to the strong metallic bonds.**	
Pure metals can be bent and shaped	**Atoms are arranged in layers that can slide over each other.**	

Alloys	***Mixture of two or more elements at least one of which is a metal***	**Harder than pure metals because atoms of different sizes disrupt the layers so they cannot slide over each other.**

Pure metal **Alloy**



Transition metals

Transition metals	***Most metals are transition metals***	• **High melting points** • **High density** • **They form coloured compounds** • **They can be used as catalysts (without being used up)**