O level chemistry notes

Redox
Definition: reactions which both oxidation and reduction reactions take place at the same time.

Oxidation
Gain in oxygen
Lose of electrons
Lose of hydrogen
Increase in oxidation state number

Reduction
Lose of oxygen
Gain of electrons
Gain in hydrogen
Decrease in oxidation state number

Fixed Oxidation numbers

0
All elements, noble gases, metals

+1
Group 1 ions, H+

+2
Group 2 ions

+3
Al3+

-1
Group 7 ions, Oxygen in H2O2, hydrogen in Metal hydrides e.g NaH

-2
O2-, S2-.

-3
Nitrides N3-

Rate of reactions
Rate of reaction can be calculated and compare by measuring a loss of mass or amount of gas collected.

Factors affected rate of reaction
• Particle size
• Temperature
• Pressure (only for all gas system)
• Catalyst
• Concentration
Use this standard statement to answer your question.
***Increase in temperature*** leads to an **increase** in the energy of the particles which leads to an ***increase*** in number of collisions. This leads to an **increase** in number of effective collisions which leads to an ***increase*** in rate of reaction. The Itallic and bold words can be change to accommodate the factors.

e.g. Increase in particle sizes leads to an increase in the surface area of the reagent which leads to an increase in number of collisions. This leads to an increase in rate of reaction which leads to an increase in rate of reaction. GOT IT? When plotting graphs, the number of moles of products determine the end point of the reaction!

Energy Changes
Enthalpy change is the amount of heat released or absorbed when a chemical reaction occurs.

Exothermic reaction – liberates heat energy to the surroundings which results in a general increase in the temperature of the surroundings.

Endothermic reaction – absorbs heat energy to the surroundings which results in a general decrease in the temperature of the surroundings.

Type of reactions Enthalpy Product energy level
Exothermic
ΔH= - ve because more heat is given out during bond forming than heat taken in to break them
Product is at a lower energy compared to reagent.
Bonds of products are stronger than bonds in reagent.

Endothermic
ΔH=+ ve because more heat is taken in to break bonds than heat is given out when bonds form.
Product is at a higher energy compared to reagent.
Bonds of reactants are stronger than products.

5 types of electrolysis systems
• Molten salt – the 2 ions will discharge
• Aqueous salt – hydrogen (unless metal is below hydrogen in that case the metal will discharge) and hydroxide ions (ALWAYS) will discharge
• Acidic solution - hydrogen and hydroxide ions will discharge
• Concentrated chlorides solution – ALWAYS chloride ions, positive ions the usual method of looking at reactivity series of methods for discharge order.
• Reactive anode (used in the purification of copper or electroplating) – anode dissolves into the solution. UNDER NO CIRCUMSTANCES will cathode dissolve. Even in simple cells the plate that dissolve (i.e. the more reactive plate that dissolves in the anode).