5.1.1 How fast?

Orders, rate equations and rate constants (a) explanation and use of the terms: *rate of reaction, order, overall order, rate constant, half-life, rate-determining step*					
(b) deduction of: (i) orders from experimental data (ii) a rate equation from orders of the form: rate = $k[A]^m[B]^n$, where m and n are 0, 1 or 2					
(c) calculation of the rate constant, k, and related quantities, from a rate equation including determination of units					
Rate graphs and orders					
(d) from a concentration–time graph: (i) deduction of the order (0 or 1) with respect to a reactant from the shape of the graph (ii) calculation of reaction rates from the measurement of gradients					
(e) from a concentration–time graph of a first order reaction, measurement of constant half-life, $t_{1/2}$					
(f) for a first order reaction, determination of the rate constant, k, from the constant half-life, $t_{1/2}$, using the relationship: $k = \ln 2/t_{1/2}$					
(g) from a rate–concentration graph: (i) deduction of the order (0, 1 or 2) with respect to a reactant from the shape of the graph (ii) determination of rate constant for a first order reaction from the gradient					
(h) the techniques and procedures used to investigate reaction rates by the initial rates method and by continuous monitoring, including use of colorimetry					
Rate-determining step					
(i) for a multi-step reaction, prediction of, (i) a rate equation that is consistent with the rate-determining step (ii) possible steps in a reaction mechanism from the rate equation and the balanced equation for the overall reaction					
Effect of temperature on rate constants					
(j) a qualitative explanation of the effect of temperature change on the rate of a reaction and hence the rate constant					
(k) the Arrhenius equation: (i) the exponential relationship between the rate constant, k and temperature, T given by the Arrhenius equation, $k = Ae^{-Ea/RT}$ ii) determination of E_a and A graphically using: $\ln k = -E_a/RT + \ln A$ derived from the Arrhenius equation.					