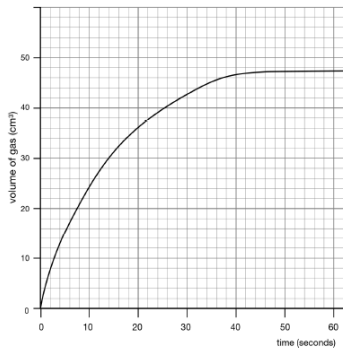


Year 13 Kinetics Revision Helpsheet

Lesson Objectives	Tasks		
Define the rate of reaction	Write a definition for the rate of reaction	How many marks do you think this is worth in an exam?	State one common mistake that may be made in answering this question.
Determine the rate of reaction from a graph	 <p>Use the graph to calculate the initial rate of reaction</p>		Write a stepwise method for calculating the rate of reaction from a graph
Understand and be able to use rate equations of the form Rate = $k[A]^m[B]^n$ where m and n are the orders of reaction with respect to reactants A and B (m, n restricted to values 1, 2 or 0)	<p>Write rate equations for the following reactions. Assume the order is zero for any species not given</p> <ul style="list-style-type: none"> a) First order for A b) First order for both A + B c) Second order for A d) Second order for B 	State the units for the rate constant for first, second, third and fourth order reactions.	<p>State the overall order and the orders for each reactant in the following rate equations:</p> <ul style="list-style-type: none"> a) Rate = $k[A]^2[B]$ b) Rate = $k[A][B]$

<p>Be able to derive the rate equation for a reaction from data relating initial rate to the concentrations of the different reactants</p>	<table border="1"> <thead> <tr> <th>Experiment</th> <th>Initial concentration of A/mol dm⁻³</th> <th>Initial concentration of B/mol dm⁻³</th> <th>Initial rate/mol dm⁻³ s⁻¹</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.15</td> <td>0.24</td> <td>0.45 × 10⁻³</td> </tr> <tr> <td>2</td> <td>0.30</td> <td>0.24</td> <td>0.90 × 10⁻³</td> </tr> <tr> <td>3</td> <td>0.60</td> <td>0.48</td> <td>7.20 × 10⁻³</td> </tr> </tbody> </table>			Experiment	Initial concentration of A/mol dm ⁻³	Initial concentration of B/mol dm ⁻³	Initial rate/mol dm ⁻³ s ⁻¹	1	0.15	0.24	0.45 × 10 ⁻³	2	0.30	0.24	0.90 × 10 ⁻³	3	0.60	0.48	7.20 × 10 ⁻³	<p>Use this experimental data to write a rate equation for the reaction of A and B to give C.</p>
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<p>Be able to explain the qualitative effect of changes in temperature on the rate constant k</p>	<p>What happens to the rate of reaction as the temperature increases?</p>	<p>What happens to the value of the rate constant as the temperature increases?</p>	<p>Explain the effect of temperature on rate of reaction</p>																	
<p>Understand that the orders of reactions with respect to reactants can be used to provide information about the rate determining/ limiting step of a reaction</p>	<p>True or false? Any species involved in or before the rate determining step can appear in the rate equation.</p>		<p>Which species can appear in the rate equation for each of these mechanisms?</p> <table border="1"> <tbody> <tr> <td>(i) A + B $\xrightarrow{\text{slow}}$ C</td> <td>(i) A + B $\xrightarrow{\text{fast}}$ C</td> <td>(i) A + B $\xrightarrow{\text{fast}}$ C</td> </tr> <tr> <td>(ii) C $\xrightarrow{\text{fast}}$ D + B</td> <td>(ii) C $\xrightarrow{\text{fast}}$ D + B</td> <td>(ii) C $\xrightarrow{\text{slow}}$ D + B</td> </tr> <tr> <td>(iii) D + E $\xrightarrow{\text{fast}}$ F</td> <td>(iii) D + E $\xrightarrow{\text{slow}}$ F</td> <td>(iii) D + E $\xrightarrow{\text{fast}}$ F</td> </tr> <tr> <td>(iv) F $\xrightarrow{\text{fast}}$ G</td> <td>(iv) F $\xrightarrow{\text{slow}}$ G</td> <td>(iv) F $\xrightarrow{\text{fast}}$ G</td> </tr> </tbody> </table>	(i) A + B $\xrightarrow{\text{slow}}$ C	(i) A + B $\xrightarrow{\text{fast}}$ C	(i) A + B $\xrightarrow{\text{fast}}$ C	(ii) C $\xrightarrow{\text{fast}}$ D + B	(ii) C $\xrightarrow{\text{fast}}$ D + B	(ii) C $\xrightarrow{\text{slow}}$ D + B	(iii) D + E $\xrightarrow{\text{fast}}$ F	(iii) D + E $\xrightarrow{\text{slow}}$ F	(iii) D + E $\xrightarrow{\text{fast}}$ F	(iv) F $\xrightarrow{\text{fast}}$ G	(iv) F $\xrightarrow{\text{slow}}$ G	(iv) F $\xrightarrow{\text{fast}}$ G					
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