Answers to exam style questions, ages 14–16

***Education in Chemistry***November 2017[rsc.li/EiC617-catalysts-get-helping-hands](http://rsc.li/EiC617-catalysts-get-helping-hands)

1. Define the term catalyst.
* *A substance which speeds up a chemical reaction*
* *Without being used up*
1. Explain how a catalyst works
* *Provides an alternative route for a reaction*
1. Draw fully labelled energy level diagrams for an exothermic reaction
	1. Uncatalysed

* 1. Catalysed

*As above but activation energy smaller, reactants and products at the same level (relative to each other). (2 marks)*

1. Give one example of a reaction that is commonly carried out in the presence of a catalyst. Include a balanced symbol equation for the reaction.
* *Any suitable example from their specification*
* *A balanced symbol equation*
* *Correct catalyst identified*
1. State 3 other factors that affect the rate of a reaction.
* *Concentration*
* *Surface area*
* *Temperature*
1. The reaction between peroxodisulfate ions and iodide ions is very slow. The reaction may be catalysed by Fe2+ ions. The reaction produces iodine. Iodine is a brown colour in water and can be further visualised with starch which produces a blue/black colour when a certain amount of iodine is produced.

S2O82– + 2I– 🡪 2SO42– + I2

1. Suggest why the reaction is very slow
* *Two negative ions are reacting together*
1. Outline an experiment which could be used to prove that Fe2+ ions catalyse the reaction.

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|  | **Indicative content** |
| Level 3 (5-6 marks): Recording of results and comparison | * *Mentions that results must be compared eg, check if the addition of catalyst makes the time shorter*
* *Calculation of rate (required to achieve the full 6 marks)*
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| Level 2 (3-4 marks): Experimental detail | * *Sensible scale for experiment*
* *Control variables (volume and concentration of solutions, way of measuring colour change eg, disappearing cross)*
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| Level 1 (1-2 marks): Carries out catalysed and uncatalysed reaction  | * *Describes a simple, feasible experiment*
* *2 experiments undertaken (one with catalyst, one without)*
* *Specific event to measure time (colour change)*
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