

## Activity 3.4 – extended writing questions

---

### Sheet 1

#### Here are the general instructions for marking 6-mark extended response questions.

This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.

Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.

The following table shows how the marks should be awarded for indicative content.

<b>Number of indicative marking points seen in answer</b>	<b>Number of marks awarded for indicative marking points</b>
6	4
5-4	3
3-2	2
1	1
0	0

The following table shows how the marks should be awarded for structure and lines of reasoning.

	<b>Number of marks awarded for structure of answer and sustained line of reasoning</b>
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning throughout	2
Answer is partially structured with some linkages and lines of reasoning	1
Answer has no linkages between points and is unstructured	0

Guidance on how the mark scheme should be applied:

The mark for indicative content should be added to the mark for lines of reasoning.

For example, an answer with five indicative marking points that is partially structured with some linkages and lines of reasoning, scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning).

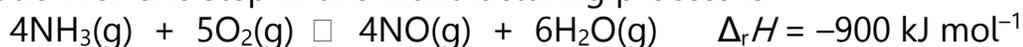
If there are no linkages between points, the same five indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and no marks for linkages).

## Sheet 2

Here is a question from the SAMs that is marked by this method

Ammonia is used in the manufacture of nitric acid.

The equation for one step in this manufacturing process is



A manufacturer carried out this reaction at a temperature of 1200 K and a pressure of 10 atm. A scientist proposes that a temperature of 1000 K should be used at the same pressure.

Evaluate the effects of making this change on the rate and yield of this reaction. (6)

Here are the indicative marking points for this question

- *temperature decrease lowers the rate of the reaction*
- *because there are fewer molecules/particles with  $E \geq E_a$*
- *and therefore there are fewer successful collisions per second*
- *temperature decrease increases the yield (of the product)*
- *because the (forward) reaction is exothermic*
- *lower rate and increased yield are opposing factors and it is not possible to tell which has greater effect on overall yield in a given time*

Apply this mark scheme to student answer A

The lowering of the temperature to 1000 °K means that the reaction is slower which is a disadvantage. The advantage is that there will be a bigger yield. This is because the reaction is exothermic so the reaction moves to oppose the change.

Apply this mark scheme to student answer B

When the temperature is decreased there are fewer collisions per minute between the molecules which means the rate is slower. The reaction is exothermic, so the ~~increased~~ decreased temperature causes a higher yield.