1   A chemist was making some aspirin. She calculated that the maximum yield of aspirin that she could make was 800 g.

The chemist carried out the experiment but only made 500g of aspirin.

Calculate the percentage yield of aspirin for this experiment.

Show clearly how you work out your answer.

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Percentage yield of aspirin = ... %
(2 marks)

1 (a) (i)   Suggest one possible reason why the percentage yield was not 100%.

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(1 mark)

(Total 3 marks)

2 (a)   Ammonia is a very useful chemical. It is produced from nitrogen and hydrogen. The equation for this reaction is:

$$N_2(g) + 3\,H_2(g) \rightleftharpoons 2\,NH_3(g)$$
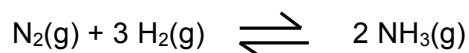
A company wants to make 13.6 tonnes of ammonia.

Calculate the mass of nitrogen needed. Relative atomic masses (Ar): H = 1; N = 14

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Mass of nitrogen = ... tonnes
(3 marks)

2 (a) (i)   The company expected to make 13.6 tonnes of ammonia. The yield of ammonia was only 8.4 tonnes.

Calculate the percentage yield of ammonia.

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Percentage yield of ammonia = ... %

(2 marks)

2 (a) (ii)   Use the equation above to explain why the percentage yield of ammonia was less than expected.

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(1 mark)

(Total 6 marks)

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question	Answers	extra information	Mark
3(a)(i)		correct answer with or without working gains **3** marks	
		accept correct rounding of intermediate answers	
	M_r of NH_3 = 17 **or** 2 (moles of) NH_3 = 34 **or** 14 → 17 **or** 28 → 34	can be credited from correct substitution from step 2	1
	(28/34) x 6.8 **or** (14/17) x 6.8	allow ecf from step 1	1
	= 5.6	allow ecf from step 1	1
3(a)(ii)	61.8	accept 61.76 **or** 62 **or** 61.76…	2
		correct answer with or without working gains **2** marks	
		if answer is not correct evidence of 4.2 / 6.8 x 100 gains **1** mark	
		if answer not correct 0.618 or	