

# **Additional Applied Science A**

General Certificate of Secondary Education **A335/02**

Unit 4: Harnessing Chemicals (Higher Tier)

## **Mark Scheme for June 2010**

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question		Expected Answers	Marks	Additional Guidance
1	(a)	<u>chemically named</u> insoluble substance (1)	[1]	<b>allow</b> correct formula ignore: common names (sand, plastic, limestone marble chips)
	(b)	solution (1) precipitate / ppt (1) filtration / filtering (1)	[3]	correct order
	(c)	sodium nitrate (1)	[1]	<b>allow</b> NaNO <sub>3</sub> if correct
	(d)	idea of different purity / grade / quality(1) idea of different use (1)	[2]	<b>allow</b> 'costs more to make' if justified by reference to more steps involved in purification (1) <b>allow</b> : e.g. "analytical and laboratory grade" (2)
	(e)	idea of $(1.3/2.0) \times 100$ (1) 65 (%) (1)	[2]	allow 65 (%) = 2 marks
		<b>Total</b>	<b>[9]</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	any <b>one</b> from: speed up the reaction; help MgO to dissolve; make MgO dissolve / react quicker/easier; increase solubility of MgO (1)	[1]	<b>allow</b> : Speed up particles (of acid)
	(b)	any <b>one</b> from: all the <u>acid</u> has reacted/been used up; reaction is complete; maximise yield; (1)	[1]	
	(c)	remove / separate solid (from mixture); (1) unreacted / excess / magnesium oxide; (1)	[2]	get rid of Magnesium oxide (2) <b>ignore</b> : impurities
	(d)	omit step 4 / Cool more slowly (1)	[1]	<b>allow</b> : evaporate at room temperature <b>reject</b> : alternative forms of heating
	(e)	H <sub>2</sub> O	[1]	correct formula only
		<b>Total</b>	<b>[6]</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	idea of (insoluble) <u>solid</u> dispersed in / mixed with a <u>liquid</u> (1)	[1]	<b>ignore:</b> floating <b>ignore:</b> examples of suspensions
	(b) i	Mg(OH) <sub>2</sub> = 2 marks	[2]	formula containing Mg, O and H only (1)
	ii	idea of multiplying by 200 (1) 80 (g/l) (1)	[2]	80 (g/l) = 2 marks allow ecf if <u>working</u> shows 0.4 x 100/5 --> 8g (1)
	(c) i	neutralises / reduces / reacts with (1) salt / magnesium chloride (1)	[2]	<b>reject:</b> dilutes / breaks down / breaks up <b>allow:</b> dissolves <u>IN</u> correct order of responses only
	ii	any <b>two</b> from: pH is less than 7 in acid / at start; pH increases (during experiment); pH reaches 7 / above 7 at end; pH of magnesium hydroxide is 7 (or higher);	[2]	<b>ignore:</b> any mention of indicators or colours <b>ignore:</b> mention of Mg(OH) <sub>2</sub> as being "alkaline"
		<b>Total</b>	<b>[9]</b>	

Question	Expected Answers	Marks	Additional Guidance
4 (a)	endothermic (1)	[1]	
(b)	change in amount of substance (removal of reagent / creation of product); per unit of time (1)	[2]	<b>ignore:</b> "how fast/slow..." <b>ignore</b> "amount of reaction" <b>ignore:</b> mention of time taken (for reaction) <b>allow:</b> <u>complete</u> reaction as a measure of amount of substance.
(c)	any <b>three</b> from: particles have more energy; particles move faster; (leading to) more collisions; (collisions) more likely to be successful / result in reaction;	[3]	<b>allow:</b> collisions more likely to reach activation energy
	<b>Total</b>	<b>[6]</b>	

Question	Expected Answers	Marks	Additional Guidance
5 (a)	idea of multiplying by 1000 (1) 900 (ppm) (1)	[2]	900 (ppm) = 2 marks 0.9 x 1 000 000 / 1 000 (1)
(b) i	solvent is <u>water</u> / dissolved in <u>water</u> (1)	[1]	<b>allow:</b> <u>Water</u> is present in solution
ii	potassium chloride (1)	[1]	<b>allow</b> KCl
iii	idea of rinsing / washing out the beaker (1)	[1]	<b>allow</b> 'use of funnel' <b>allow:</b> <u>pouring</u> down a glass rod <b>reject:</b> filter/filtration
(c)	Health and Safety Executive/ HSE	[1]	correct answer only
	<b>Total</b>	<b>[6]</b>	
	<b>Paper Total</b>	<b>[36]</b>	

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