

Additional Applied Science A

General Certificate of Secondary Education

Unit **A335/02**: Harnessing Chemicals (Higher Tier)

Mark Scheme for June 2012

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL










Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk





Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
e cf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Question		Answer	Marks	Guidance										
1	(a)	(i)	pipette	1										
		(ii)	burette	1										
		(iii)	named acid/alkali indicator; appropriate colour change	2										
(b)	(i)	hydrochloric acid + sodium hydroxide(1) sodium chloride + water(1)	2	reagents in either order. accept formulae if correct products in either order										
		(ii)	magnetic stirrer; "flea"	2	allow stirring rod(1) ignore spatula, spoon etc									
		(iii)	swirl (contents of flask)	1	accept shake etc reject stirring (rod) ignore emulsifier									
(c)		idea of (partial) evaporation of water; way of <i>causing</i> evaporation (heating/leaving etc); idea of time/cooling/etc to make crystals	3	ignore issues of crystal size heat solution gently, until volume of solution decreases by half, for two marks accept suitable description										
(d)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>NaNO₃</td> <td>KNO₃</td> </tr> <tr> <td>Na₂SO₄</td> <td style="background-color: #cccccc;"></td> </tr> </table>	NaNO ₃	KNO ₃	Na ₂ SO ₄		2	all three correct = 2 marks, one or two correct = 1 mark accept NaHSO ₄ instead of Na ₂ SO ₄						
NaNO ₃	KNO ₃													
Na ₂ SO ₄														
(e)	(i)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td>silver chloride</td><td>✓</td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table>					silver chloride	✓					1	
silver chloride	✓													
	(ii)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td>zinc nitrate</td><td>✓</td></tr> <tr><td>magnesium sulfate</td><td>✓</td></tr> </table>							zinc nitrate	✓	magnesium sulfate	✓	2	
zinc nitrate	✓													
magnesium sulfate	✓													

Question			Answer	Marks	Guidance
2	(a)	(i)	as pressure increases the yield increases	1	ignore any references to temperature accept reverse argument
		(ii)	advantage: faster reaction; disadvantage: lower yield	2	allow higher (fuel) cost/more energy needed
	(b)	(i)	84 / 28 x 34; 102 (tonnes)	2	correct answer with no working gets both marks 51 tonnes = 1 mark
		(ii)	use of 50% yield; 51 (tonnes)	2	allow ecf
	(c)		any appropriate explanation eg slow reaction / engineering of large pressurised vessel/ difficulty separating products	1	allow: more dangerous allow: high initial cost
	(d)		lower temperature; leading to lower energy demand / lower pressure; leading to lower energy demand	2	allow air is a renewable/free raw material ignore economic arguments

Question			Answer	Marks	Guidance
3	(a)	(i)	any suitable example,	1	eg rubber tree → rubber silk worm → silk
		(ii)	source is not (currently) alive; but once was alive	2	accept has died (2)
		(iii)	hydrogen and carbon	1	either order- both required accept correct symbols H and C
(b)	(i)	LPG	1	accept (Liquefied Petroleum) Gas accept "under 20°C"	
	(ii)	any two from: lower throughput owtte; waste of heat between batches; higher labour cost	2	no profit when not running	
(c)		allows oil and water to stay mixed / prevents separation; oil is dispersed / sinks;	2	allow two marks for good description of mechanism of emulsification	
Total				36	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2012

