



eduresourceza.com



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY

0620/41

Paper 4 Extended Theory

October/November 2016

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2016 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

© IGCSE is the registered trademark of Cambridge International Examinations.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of 7 printed pages.



CAMBRIDGE
International Examinations

© UCLES 2016

[Turn over

Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
1(a)	H	1
1(b)	G	1
1(c)	filtration	1
1(d)	fractional distillation	1 1
1(e)	add / mix / stir / dissolve / shake / heat with water filter / decant heat (filtrate) or (leave filtrate to) evaporate	1 1 1
1(f)	electrons (electrons) move / flow (throughout structure)	1 1

Question	Answer	Marks
2(a)(i)	melt(ing)	1
2(a)(ii)	sublimation / sublime	1
2(a)(iii)	condensing / condensation	1
2(b)	overcome / break the attractive forces	1
2(c)	E AND particles hit the walls (of the container) more often	1

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
3(a)(i)	heated / evaporated / boiled	1
3(a)(ii)	any 2 from: (O is) more viscous / thicker (O is) darker (O has) longer / bigger molecules / more carbon atoms (O has a) higher boiling point OR melting point (O is) less flammable	2
3(b)	any 2 from: similar / same chemical properties same functional group trend / pattern in physical properties (neighbouring members) differ by CH ₂ common methods of preparation	2
3(c)	any 2 structures from: pentane methylbutane dimethylpropane	2
3(d)	correct structure with any number from 1 to 6 of the hydrogen atoms replaced by chlorine atoms	1
3(e)(i)	(ends in) ene	1
3(e)(ii)	M1 88.24 / 12 AND 11.76 / 1 M2 7.353 / 7.353 (= 1) AND 11.76 / 7.353 = (1.6) M3 C ₅ H ₈	1 1 1
3(e)(iii)	relative molecular mass	1

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
4(a)(i)	$\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ M1 formulae M2 balancing	2
4(a)(ii)	(nitrogen) air / atmosphere (hydrogen) steam / water / hydrocarbons / natural gas	1 1
4(a)(iii)	(temperature) answer in range 370–470 °C (pressure) answer in range 150–300 atm	1 1
4(b)(i)	M1 forward and reverse reactions (occur) M2 amounts / moles / concentrations (of reagents and products) constant OR M2 rate of forward and reverse reactions equal	1 1
4(b)(ii)	<u>endothermic</u> AND yield increases as temperature increases	1
4(b)(iii)	M1 yield decreases (as pressure increases) M2 because more moles / molecules (of gas) on the right M3 so position of equilibrium moves left	1 1 1

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
5(a)	(gas) oxygen (test) glowing splint (result of test) relights	1 1 1
5(b)	reference to ions / ionic ions cannot move in solid OR are in fixed positions in solid ions can move when in solution	1 1 1
5(c)(i)	copper ions / Cu^{2+} gain of electrons / oxidation number decreases	1 1
5(c)(ii)	any 3 from: anode decreases (in mass) copper removed (from anode) / solid (copper from anode) becomes aqueous cathode increases (in mass) copper deposited / added / Cu^{2+} deposited as Cu (on cathode)	3
5(c)(iii)	copper is both added and removed (at same rate) OR the concentration (of copper ions) does not change	1

Question	Answer	Marks
6(a)	large / big molecule made from (many) monomers (joined together)	1 1
6(b)(i)	amide / peptide	1
6(b)(ii)	(can be) broken down by microbes / bacteria	1 1
6(b)(iii)	starch / cellulose / DNA / RNA / polysaccharides /	1

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
6(c)(i)	M1 at least one correct ester linkage between boxes	1
	M2 at least two boxes shown and sufficient correct C and O atoms to make two correct ester linkages	1
	M3 continuation bond(s) AND if more than one repeat unit is shown, the repeat unit must be correctly identified	1

Question	Answer	Marks
7(a)	0.025	
	M1 50 / 1000 (=0.05)	1
	M2 $(0.05 \times 0.5) = 0.025$	1
7(b)	0.0125	1
7(c)	0.55	
	M1 44	1
	M2 0.55	1
7(d)	0.3	1

Page 7	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0620	41

Question	Answer	Marks
8(a)(i)	any 4 from: slowed down acid became less concentrated OR fewer particles per unit volume fewer collisions per second OR lower collision rate (then the reaction) stopped all the hydrochloric acid reacted	4
8(a)(ii)	any 4 from: faster (reaction) (powder has) larger surface area more collisions per second OR higher collision rate same volume of gas amount / moles hydrochloric acid is not changed	4
8(b)	any 5 from: temperature increased particles have more energy (particles) move faster more collisions per second OR higher collision rate more particles have sufficient energy to react / activation energy more of the collisions are successful	5