

Unit Code: H433/03

Qual Name: A level Chemistry B

Qual Title: Practical skills in chemistry

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject, If required	Additional Notes/Comments
1	1(a)	1	AO1	1.1.2a	practical techniques		
1	1(b)(i)	1	AO1	CDf	organic functional groups	Identifying homologous series from functional group.	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
1	1(b)(ii)	2	AO2	PL ai;m;j	organic reactions	Hydrolysis of amides and esters	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
1	1(b)(iii)	2	AO2	PLi	zwitterions	Structure on zwitterions	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
1	1c	6	AO2	PLaii 1.1.1a 1.1.3a	practical skills	chromatography methodology	
1	1(d)	2	AO2	PLm	hydrolysis of organic compounds	Acid hydrolysis	
2	2ai	1	AO3	OZf 1.1.1b	Practical skills	Control variables	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
2	2aii	3	AO3	ELbi 1.1.1a	Mole calculations		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
2	2aiii	1	AO2	ELbi	Mole calculations		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
2	2b	1	AO1	ClaiV	Rates of reaction	Rate equations	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
2	2c	5	AO2	OZf; Clc 1.1.13d	Practical skills	Plotting and interpreting graphical data	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
2	2d	6	AO1	Clc,d; 1.1.3d	Calculating activation energies	Plotting and interpreting graphical data	
3	3a	2	AO2	WMdii	Oxidation of alcohols		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers

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3	3b	4	AO1, AO2	WMdii; CDi 1.1.1a	Experimental techniques and functional groups	Reflux and distillation	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
3	3c	4	AO1, AO3	DFoi; CDf	Testing for functional groups	Experimental procedure for testing unsaturation in a molecule	
3	3d	3	AO1, AO2	DFTi	Stereoisomerism	E/Z	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
3	3e	1	AO2	WMI(i)	Modern analytical techniques	Mass spectrometry	
4	4ai	1	AO3	ELci 1.1.1a	Practical skills		
4	4aii	1	AO2	ELci 1.1.1a	Practical skills		
4	4aiii	4	AO3	Elbi DMn	Formulae, equations and amount of substance		
4	4aiv	2	AO3	1.1.4d	Practical skills	Evaluation of errors	
4	4av	1	AO2	DMn	Modern analytical techniques	Colorimetry	
4	4b	6	AO1	ELcii 1.2.2a,e	Practical skills	Preparing a standard solution	
5	5a	3	AO1	CDh	Diazonium compounds		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
5	bi	1	AO2	CDh	Azo dyes		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
5	bii	4	AO1	CDm	Origins of colour in organic molecules		
5	ci	1	AO2	CDbi	Structure and properties of dye molecules		
5	cii	1	AO1	CDbii	Structure and properties of dye molecules		
5	d	2	AO3	OZb,c	Intermolecular bonding	Interaction between dye molecules and fibres	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
6	6ai	1	AO3	1.2.2j 1.1.1a	Electrochemical cells		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
6	aii	1	AO2	ESe	Redox	Oxidation states	
6	b	3	AO2	ELbi; DFa	Gas volume calculation		
6	c*	6	AO3	DMdiii,fi	Electrochemical cells	Practical PAG 8	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
6	d	5	AO2	ELci Oh	Chemical equilibria	Solubility products	

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7	7ai	1	AO1	ESk	Halogens and Halide ions	Identification	
7	a ii	1	AO1	ESk	Precipitation reactions	Ionic equations	
7	bi	1	AO2	ESdi,ii	Redox reactions	Half equations	
7	bii	2	AO2	ES e	Redox reactions	Oxidation states	
7	biii	4	AO2	ELbi,ci OZi	Mole calculations	Titrations	
7	biv	1	AO2	1.1.4(d)(e)	Percentage errors		
7	bv	1	AO3	1.1.4(d)(e)	Refining of experimental design	Improving accuracy in titrations	
7	c*	6	AO3	DM(n)	Analytical techniques	Colometry methodology	
8	8ai	1	AO2	WMa	Structural formulae		
8	a ii	3	AO2	ELbii	Percentage yield calculation		
8	bi	1	AO2	PLn	Hydrolysis of organic molecules	Acyl chlorides	
8	bii	1	AO3	WMcii	Properties of phenols	Use of iron(III) chloride solution	
8	biii	3	AO2	WMe 1.1.4(d)(e)	Criteria of purity measurement	Taking melting points	
8	biv	1	AO3	WMe	Criteria of purity	Interpreting melting point values	
8	bv	1	AO2	WMe	Recrystallisation	Choice of solvent	
8	c	4	AO3	WMe	Thin layer chromatography	Evaluating results	
9	9a	3	AO1, AO2	PL(q)i,ii,iii DF(c)	Stereoisomerism	Optical	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
9	bi	2	AO1, AO2	PL(k)(m)	Ester hydrolysis		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
9	bii	2	AO2	OZ(a)(b)	Intermolecular bonding	Role of electronegativity	
9	c	2	AO1	DF(h)(i)	Heterogeneous catalysis	Four step model	
10	10a	2	AO1	PL(k)(l)	Organic functional groups		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	b	2	AO2	CD(g)(l)i	Organic reaction	Electrophilic substitution and reduction	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	c	3	AO3	1.2.1b	Safe use of practical equipment and materials	Risk assessment	
10	d	1	AO2	CDI(ii)	Reaction mechanisms	Use of curly arrows	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers

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10	ei	3	AO2, AO3	WM(e)1.1.2a	Practical techniques	Vacuum filtration	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	eii	1	AO3	WM(e)1.1.2a	Practical techniques	Choice of techniques	
10	f	3	AO2	EL(b)i	Percentage yield calculation	Includes appropriate sig. figs.	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	g*	6	AO3	WM(j), PL(s)(t)	Use of spectra to identify organic compounds	IR, pNMR, C13NMR	Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	hi	2	AO2	WM(i),ii,iii PLr(ii)	Interpretation of mass spectra		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
10	hii	1	AO2	WM(i),ii,iii PLr(ii)	Interpretation of mass spectra		
11	11a	2	AO1	O(m)i	Buffer solutions		
11	11b	2	AO2	Om(iii) 1.1.3a	Calculation of pH of weak acid	Given Ka of a weak acid	
11	11c	2	AO2	(O)(i)(k)	Acid-base equilibria	Bronsted-Lowry theory	
11	11d	3	AO2	O(l)ii	Calculation of pH of strong base	Use of Kw	
11	11e	3	AO3	EL(c)(ii) (t)1.1.1a	Practical procedure for weak acid strong base titration to produce pH/vol. graph		Please note: Images are not to scale as they may vary in colour, density, shade and size when reproduced using different printers and photocopiers
12	12a	1	AO3	CL(b) 1.1.3a	Processing and interpreting quantitative results	Titration	
12	bi	1	AO3	EL(c)(ii)(t) 1.1.2a	Use of appropriate maths skills for analysis of quantitative data	Calculation of average titre values	
12	bii	4	AO2, AO3	EL(b)(i)DM(a)CL(a) 1.1.3b	Manipulation of data	changing between units	
12	ci	1	AO2	CL(a) 1.1.4d	percentage uncertainty calculations		
12	cii	2	AO3	EL(c)(ii)CL(a) 1.1.4e	refining of experimental design	improving accuracy	
12	d*	6	AO1, AO3	DM(j)(i)(k)(m)ii	d block ions and origin of colour		