

Unit Code: H432/03

Qual Name: A level Chemistry A

Qual Title: Unified chemistry

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject	Additional Notes/Comments
1	1a	3	AO1, AO2	2.2.2n, 2.2.2g,h	Structure and bonding	Water and methane hydrate, including bond angles, formula determination and ideal gas calculation	
1	1b	1	AO2	4.2.4b	Analytical techniques		
1	1c	2	AO1, AO2	2.1.3a(iv), 2.1.3e(i), 2.1.3d	Amount of substance		
1	1d	4	AO2	2.1.3a(iv), 2.1.3e(i)(ii), 2.1.3f	Amount of substance		
1	1e	1	AO2	4.1.2e	Alkanes		
2	2a	6	AO3	3.2.1d(ii),e,g(iii),h 2.1.3a(ii),e 1.1.3a,b,c	Enthalpy changes, Amount of substance	Experimental determination of enthalpy changes with Hess' Law, and oxidation states	Level of response
2	2b	2	AO2	3.2.1h, 1.1.4d	Enthalpy changes		
2	2c	2	AO3	3.2.1h, 1.1.1c, 1.1.4a,c,e	Enthalpy changes		
2	2d(i)	1	AO2	2.1.5c	Redox		
2	2d(ii)	2	AO2	2.1.5a,d(ii), 2.1.5f	Redox		
2	2d(iii)	1	AO2	5.2.3b	Redox and electrode potentials		
3	3a(i)	3	AO2	5.1.1b,c 1.1.3a,b	How fast?	Hydrogen peroxide: k from initial rates, electrode potentials and mole calculation involving Kc	
3	3a(ii)	3	AO3	5.1.1k 1.1.1a,b	How fast?		
3	3b	4	AO1, AO2	3.2.2c(i), 5.2.3i, 2.1.2b	Reaction rates, Redox and electrode potentials Compounds, formulae and equations		
3	3c(i)	1	AO2	4.1.1b(ii)	Basic concepts of organic chemistry		
3	3c(ii)	3	AO1, AO2	5.1.2d,e	How far?		
4	4a(i)	3	AO1, AO2	2.1.4d 1.1.2b,c	Acids	Acid–base titration and reactions of a hydroxycarboxylic acid, and the chromium(III) picolinate complex	

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4	4a(ii)	1	AO1	6.1.3b	Carboxylic acids and esters		
4	4a(iii)	6	AO3	2.1.3a(iv), 2.1.3e(i)(iii), 2.1.4e, 6.2.2d, 4.1.1e 1.1.3a,b	Amount of substance, Acids, Amino acids, amides and chirality, Basic concepts of organic chemistry		
4	4b(i)	3	AO1, AO2	6.1.3b, 2.1.2b, 1.1.3a	Carboxylic acids and esters, Compounds, formulae and equations		
4	4b(ii)	3	AO1, AO2	6.1.3c(i), 6.2.3a(i), 2.1.2b, 1.1.3a	Carboxylic acids and esters, Polyesters and polyamides, Compounds, formulae and equations		
4	4c(i)	1	AO2	5.3.1e	Transition elements		
4	4c(ii)	2	AO2	2.1.3a(iv), 2.1.3e(i), 4.1.1b(iv)	Amount of substance, Basic concepts of organic chemistry		
5	5a(i)	1	AO1	5.1.3c(i), 4.1.1b(iv)	Acids, bases and buffers Basic concepts of organic chemistry	Properties and reactions of thiols; planning chemical tests to distinguish compounds from their functional groups	Level of response
5	5a(ii)	2	AO3	6.1.3c(i)	Carboxylic acids and esters		
5	5a(iii)	1	AO1	4.1.1a, 4.1.1b(iv)	Basic concepts of organic chemistry		
5	5a(iv)	2	AO3	6.2.5b(i)	Organic synthesis		
5	5b	6	AO3	6.3.1c 1.1.1a	Chromatography and qualitative analysis		
6	1a(i)	1	AO1	2.2.1d(ii)	Electron structure	Elements, identification from properties; trend in structure and bonding of chlorides from provided data	
6	1a(ii)	1	AO1	3.1.1c(i)	Periodicity		
6	1a(iii)	1	AO2	3.1.1c(ii)	Periodicity		
6	1a(iv)	1	AO1	2.2.2g	Bonding and structure		
6	1a(v)	1	AO1	3.1.3e(i)	The halogens		
6	1a(vi)	1	AO2	2.1.3a(iv)	Amount of substance		
6	1a(vii)	1	AO2	2.1.5a	Redox		
6	1a(viii)	1	AO2	2.1.3e(ii), a(i)(iv)	Amount of substance		
6	1b	5	AO1, AO2	2.2.2c, 2.2.2o, 3.1.1a(ii), 3.1.1g	Structure and bonding, Periodicity		
7	2ai	5	AO2, AO3	5.1.1d(ii) 1.1.3d(i)(ii)	How far?	Rate determination (graphical), electrode potentials and interpretation of equilibrium experimental results.	

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7	2a(ii)	3	AO2	2.1.3e(ii)(iii), 2.1.3g 1.1.3a,b,c	Amount of substance		
7	2b	2	AO3	5.2.3a,b,c,i	Redox and electrode potentials		
7	2c	3	AO2, AO3	3.2.3b, 5.3.1d,e(i)(ii)	Chemical equilibrium, Transition elements		
8	3a	3	AO2	5.3.1e,f(ii)	Transition elements	Unfamiliar redox titration	
8	3b(i)	1	AO3	5.2.3d,e(ii) 1.1.4a	Redox and electrode potentials		
8	3b(ii)	6	AO3	5.2.3e(ii), 2.1.3e(iii), 2.1.3g, 2.1.3a(i)(iv) 1.1.3a,b,c, 1.1.4b	Redox and electrode potentials, Amount of substance		
9	4a(i)		AO1	2.1.5a	Redox	cis-platin and paracetamol, including its synthesis	Level of response
9	4a(ii)		AO3	4.1.1h	Basic concepts of organic chemistry		
9	4b(i)		AO1	6.2.5b(i)	Organic synthesis		
9	4b(ii)		AO1, AO2, AO3	2.1.3(ii)(iv), 2.1.3e(i), 2.1.3h(i), 6.1.3f, 6.2.1b(ii), 6.2.5a(ii) 1.1.1a, 1.1.2a	Amount of substance, Carboxylic acids and esters, Amines, Organic synthesis		
10	5a	4	AO2	3.2.1d(ii)(v), 3.2.1e 1.1.3a,b,c	Enthalpy changes	Enthalpy change of neutralisation (practical) and its esterification, including Kc	
10	5bi	1	AO3	2.1.4d	Acids		
10	5bii	1	AO3	5.1.2d, 2.1.2b	How far?, Compounds, formulae and equations		
10	5biii	1	AO1, AO3	4.1.1b(iv)	Basic concepts of organic chemistry		
10	5biv	1	AO3	2.1.3g, 5.1.2e	Amount of substance, How far?		
10	5bv	3	AO1, AO2	2.1.3a(ii),g, 5.1.2b,d,e 1.1.3a,b,c	Amount of substance, How far?		
11	6ai	1	AO2	4.1.1a	Basic concepts of organic chemistry	Acid–base pairs from a provided unfamiliar reaction; roles of electrophiles in organic chemistry	Level of response
11	6aii	1	AO1	6.2.5b(ii)	Organic synthesis		
11	6aiii	3	AO2, AO3	5.1.3a(i)(ii), 5.1.1(i)(ii)	Acids, bases and buffers, How fast?		
11	6aiv	1	AO3	6.2.5c	Organic synthesis		
11	6b	6	AO1, AO2	4.1.1i, 4.1.3g,h, 6.1.1 e,g	Basic concepts of organic chemistry, Alkenes, Aromatic compounds		

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12	1a	2	AO1	2.2.2j(i),(ii)	Structure and bonding	Short questions from different areas of chemistry	
12	1b	1	AO1	2.1.1a,e	Atomic structure and isotopes		
12	1c	1	AO2	5.1.2a	How far?		
12	1d	2	AO2	2.1.3a(i)(iv), 2.1.3e(i), g	Amount of substance		
12	1e	1	AO2	5.1.1a,b(i), 5.1.3d	How far?, Acids, bases and buffers		
12	1f	2	AO2	2.1.3a(iii)(iv), e(i)	Amount of substance		
13	2a	1	AO1	5.1.3a(i)	Acids, bases and buffers	Preparation of benzoic acid: interpretation of observations and results	
13	2b	1	AO2	5.1.3b 1.1.1a, c	Acids, bases and buffers		
13	2c	1	AO2	2.1.2b, 4.2.1c(i)	Compounds, formulae and equations		
13	2d	3	AO1, AO2	2.1.3a(i)(iv), 2.1.3e(i), 2.1.3h(i), 1.1.3a,b	Amount of substance		
13	2e	2	AO3	6.2.5a(ii) 1.1.1a, 1.1.2a	Organic synthesis		
14	3a(i)	1	AO2	2.1.2b	Compounds, formulae and equations	Formula determination of a lead oxide by an unfamiliar method; properties of Group 14 (4) oxides	
14	3a(ii)	1	AO3	2.1.3i 1.1.2a	Amount of substance		
14	3a(iii)	2	AO3	2.1.3i 1.1.1a, 1.1.4c,e	Amount of substance		
14	3a(iv)	2	AO2	2.1.3a(i)(iv), 2.1.3b(i),c, 2.1.3e(i) 2.1.3i, 1.1.3a,b	Amount of substance		
14	3b	4	AO1, AO2	2.2.2o, 3.1.1e,f	Structure and bonding, Periodicity		
15	4a(i)	1	AO1	6.1.1c	Aromatic compounds	Chemicals in Dettol, including Ka determination, stereoisomerism and reactions of functional groups	
15	4a(ii)	1	AO2	6.3.2c	Spectroscopy		
15	4a(iii)	2	AO1, AO2	6.3.1c(iii) 1.1.1c	Chromatography and qualitative analysis		

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15	4a(iv)	5	AO1, AO2	2.1.3a(i)(iv), 2.1.3e(i)(iii), 5.1.3c(i), 5.1.3d, 5.1.3g 1.1.3a,b,c	Amount of substance, Acids, bases and buffers		
15	4b(i)	1	AO2	6.2.2d	Amino acids, amides and chirality		
15	4b(ii)	4	AO1, AO2	4.1.3c(i)(ii),d	Alkenes		
15	4b(iii)	4	AO3	4.1.3f(i)(ii)(iii)(iv), 4.2.1d,e, 6.1.3c(i)(ii), f, 6.2.5b(i)(ii)	Alkenes, Alcohols, Carboxylic acids and esters, Organic synthesis		
16	5a(i)	6	AO3	5,2,1d(i),(ii), 2.1.3a(ii), e, 3.2.1d(ii),e,g(iii),h, 1.1.3a,b,c	Lattice enthalpy, Amount of substance, Enthalpy changes	Experimental determination of enthalpy changes with Hess' Law; entropy and free energy	Level of response
16	5a(ii)	1	AO2	3.2.1h, 1.1.4d	Enthalpy changes		
16	5b	4	AO2	3.2.1d(i), 5.2.2c, e	Enthalpy changes, Enthalpy and entropy		
16	5c(i)	1	AO1	2.2.2g, h	Structure and bonding		
16	5c(ii)	1	AO3	4.1.1b(iii)	Basic concepts of organic chemistry		
17	6a(i)	2	AO3	5.3.1j(i),l, 5.3.2a(ii)	Transition elements, Qualitative analysis	Interpretation of a flowchart for reactions of iron compounds; identification of unknowns from provided experimental data	Level of response
17	6a(ii)	1	AO3	2.1.5a	Redox		
17	6a(iii)	1	AO3	5.3.1k(i), 2.1.2b	Transition elements, Compounds, formulae and analysis		
17	6a(iv)	2	AO3	5.2.3b, 5.3.1l, 2.1.2b	Redox and electrode potentials, Transition elements, Compounds, formulae and equations		
17	6b	6	AO1, AO3	5.3.1l, 2.1.3a(i)(v), 2.1.3e(ii), g, 2.1.2b, 1.1.3a,b	Transition elements, Amount of substance, Compounds, formulae and equations		