Unit Code: H032/02

Qual Name: AS Level Chemistry A

Qual Title: Depth in chemistry

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject	Additional Notes/Comments
1	1(a)(i)	1	AO1	2.2.2(a)	Bonding and structure	Properties and reactions of barium oxide, nitride and chloride	
1	1(a)(ii)	2	AO1, AO2	2.2.2(a)	Bonding and structure		
1	1(a)(iii)	2	AO2	2.1.3(a)(iii), 2.1.3e	Amount of substance		
1	1(b)(i)	2	AO1	2.2.2(c)	Bonding and structure		
1	1(b)(ii)	2	AO1	3.1.4(a)(i) 1.1.1a	Qualitative analysis		
1	1(b)(iii)	2	AO2	2.1.3(a)(iv), 2.1.3d	Amount of substance		
1	1(c)(i)	1	AO1	2.2.1(d)(ii)	Electron structure		
1	1(c)(ii)	4	AO2, AO3	2.1.2(a)(b)	Compounds, formulae and equations		
2	2	6	AO3	3.1.2(b)(iii), 3.1.2(c), 2.1.3e(i), 3.2.2e 1.1.1a,b	Group 2, Reaction rates	Experimental rate determination for reaction of a metal with HCl	Level of response
3	3(a)(i)	4	AO1, AO2	1.1.3a,b,c, 3.2.1(e)	Enthalpy changes	Enthalpy changes of combustion by experiment and from ΔfH data	
3	3(a)(ii)	2	AO2	1.1.4(c), 4.1.2(e), 3.2.1e	Alkanes, Reaction rates		
3	3(b)(i)	1	AO2	1.1.3(d), 2.1.1(e)	Atomic structure and isotopes		
3	3(b)(ii)	3	AO3	1.1.3(a)(d), 2.1.3(e)(i), 2.1.3(iv)	Amount of substance		
3	3(c)	3	AO1, AO2	3.2.1(g)(ii)	Enthalpy changes		
4	4(a)	2	AO1, AO2	2.2.2i,j(i), 2.2.1l, 4.2.1(a)(i)	Bonding and structure, Alcohols	Alcohol, including properties, mass spectrum and oxidation (experimental)	Level of response
4	4(b)(i)	1	AO2	4.1.1(a)	Basic concepts and hydrocarbons		
4	4(b)(ii)	2	AO2	4.2.4f,g	Analytical techniques		
4	4(c)	6	AO1, AO2, AO3	1.1.2a,c, 4.2.1c 4.2.3(a)(i)	Alcohols, Organic synthesis		

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5	5(a)	1		4.1.1(b)(i)	Basic concepts and hydrocarbons	Bond angles in a carboxylic acid, IR analysis and chlorination of a carbon chain, including mechanism	
5	5(b)(i)	2		2.2.2g,h, 4.1.2(b)	Bonding and structure, Alkanes		
5	5(b)(ii)	1		2.2.2(g)	Bonding and structure		
5	5(c)	4		4.1.1(e), 4.2.4c(i),(ii), 4.2.4d	Basic concepts and hydrocarbons, Analytical techniques		
5	5(d)(i)	1		4.1.2(f)	Alkanes		
5	5(d)(ii)	1		4.1.2(f)	Alkanes		
5	5(d)(iii)	1		4.1.1(f)(i)	Basic concepts and hydrocarbons		
5	5(d)(iv)	2		4.1.2(f)	Alkanes		
5	5(d)(v)	1		4.1.2(f)	Alkanes		
5	5(d)(vi)	1		4.1.2(g)	Alkanes		
6	6(a)(i)	2	AO3	4.2.1(d), 4.2.2(a)(i)	Alcohols, haloalkanes	Synthesis of an alkene from a haloalkane and its bromination, including mole calculation and mechanism	
6	6(a)(ii)	3	AO1, AO2	1.1.3b,c, 2.1.3(e)(i), 2.1.3a(iv), 2.1.3(h)(i)	Amount of substance		
6	6(b)	4	AO1, AO2	4.1.3(f)(ii), 4.1.3h	Alkenes		
7	1(a)	1	AO1	2.1.4(d)	Acids	Acid–base titration of a weak acid	
7	1(b)	1	AO1	2.1.4(a)	Acids		
7	1(c)(i)	4	AO1, AO2	2.1.4(d) 1.1.2(b), 1.1.2(c), 1.1.3(a)	Acids		
7	1(c)(ii)	1	AO2	2.1.4(d), 1.1.3(b), 1.1.4d	Acids		
7	1(c)(iii)	1	AO3	2.1.4(d) 1.1.4(e)	Acids		
7	1(d)(i)	4	AO2	2.1.3a(ii),(iv), 2.1.3e(i),(iii), 2.1.4(e) 1.1.3(a), 1.1.3(b),	Amount of substance, Acids		
7	1(d)(ii)	1	AO3	2.1.3a(iv), 4.1.1e	Amount of substance, Basic concepts and hydrocarbons		
8	2(a)	2	AO1, AO2	2.2.2(a)	Bonding and structure	Bonding and structure of sodium, sulfur and sodium sulfide from data	

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8	2(b)	3	AO2	2.2.2(c), 3.1.1(d)(ii), 3.1.1(f), 3.1.1(g)	Bonding and structure, Periodicity		
8	2(c)(i)	1	AO1	2.2.1(d)(i)	Electron structure		
8	2(c)(ii)	2	AO3	2.1.2(b), 2.1.3(c)	Compounds, formulae and equations, Amount of substance		
9	3(a)(i)	1	AO2	3.1.3(c)	The halogens	Halogens, including relative reactivity, disproportionation and enthalpy changes form bond enthalpies	
9	3(a)(ii)	3	AO1	3.1.3(d)	The halogens		
9	3(b)(i)	3	AO1, AO2	2.1.5(d)(ii), 3.1.3(e)(iii)	Redox, The halogens		
9	3(b)(ii)	1	AO1	3.1.3(f)	The halogens		
9	3(c)	2	AO2	3.2.1(f)(iii)	Enthalpy changes		
9	3(d)(i)	1	AO3	2.1.2(b)	Compounds, formulae and equations		
9	3(d)(ii)	1	AO3	2.2.2(k), 3.2.1(a)	Bonding and structure, Enthalpy changes		
10	4(a)(i)	2		3.2.1(b), 3.2.1(c)	Enthalpy changes	Industrial preparation from ammonia, including enthalpy profile, mole calculation and conditions in industry	
10	4(a)(ii)	4		2.1.3a(ii),(iv), 2.1.3(e)(i)	Amount of substance		
10	4(b)	1		3.2.3(f)	Chemical equilibrium		
10	4(c)	5		3.2.3(b), 3.2.3(e)	Chemical equilibrium		
11	5(a)(i)	6	AO3	4.2.1(e), 4.2.3(a)(ii) 1.1.1(a)	Alcohols, Organic synthesis	Preparation of 1-bromobutane from an alcohol (experimental) and rate from graph	Level of response
11	5(a)(ii)	2	AO2	2.1.3a(ii),(iv), 2.1.3e(i), 2.1.3h(i), 1.1.3d(ii), 1.1.3b	Amount of substance		
11	5(b)	2	AO3	3.2.2(b) 1.1.3d(ii), 1.1.3b	Reaction rates		
12	6(a)	1	AO2	4.1.3(f)(iv)	Organic synthesis	Alkene reactions including mechanism and polymers	
12	6(b)(i)	1	AO2	4.1.1(a)	Basic concepts and hydrocarbons		
12	6(b)(ii)	3	AO1, AO2	4.1.1i, 4.1.3h,i	Basic concepts and hydrocarbons, Alkenes		
12	6(c)(i)	2	AO2	2.1.2(b), 4.1.3j(i)	Compounds, formulae and equations, Alkenes		

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12	6(c)(ii)	2	AO1, AO2	4.1.3k(i),(iii)	Alkenes		
13	7	6	AO3	2.1.3(c), 4.1.3(c)(i), 4.2.4c(ii),d, 4.2.4f,g	Amount of substance, Alkenes, Analytical techniques	Analysis of organic unknown from percentage compositions, IR and mass spectra.	Level of response
14	1a(i)	2	AO1	2.1.1c	Atomic structure and isotopes	Properties and reactions of strontium and formula of hydrated stronium chloride from experimental results	
14	1a(ii)	2	AO1	2.1.1d(ii), 2.1.1b,c	Atomic structure and isotopes		
14	1b	5	AO1, AO2	3.1.1d(i),(ii), 3.1.1f	Periodicity		
14	1c(i)	1	AO2	2.1.2b, 3.1.2b(ii)	Compounds, formulae and equations, Group 2		
14	1c(ii)	2	AO2	3.1.2b(ii), d 1.1.3a	Group 2		
14	1d(i)	3	AO3	2.1.3a(i)(iv), 2.1.3e(i), 2.1.3d, 2.1.3h(i) 1.1.3a,b,c	Amount of substance		
14	1d(ii)	1	AO3	2.1.3d, 2.1.3h(i) 1.1.4c	Amount of substance		
14	1d(iii)	2	AO3	2.1.3d, 2.1.3h(i) 1.1.4e	Amount of substance		
15	2a	6	AO2	2.1.3e(i),(iii), 2.1.4d, 1.1.1a, 1.1.2a	Amount of substance, Acids	Preparation of a standard solution, mole calculation and oxidation numbers	
15	2b	3	AO2	2.1.3e(i),(iii), 2.1.3g	Amount of substance		
15	2c	2	AO2	2.1.5d(ii)	Redox		
16	3a(i)	3	AO2	4.2.2a(i), c	Haloalkanes	Hydrolysis of an iodoalkane, with mechanism, and mass spectrum interpretation of iodoakanes	
16	3a(ii)	1	AO3	4.2.2a(ii), 1.1.1a	Haloalkanes		
16	3a(iii)	2	AO3	4.2.2d	Haloalkanes		
16	3b(i)	1	AO1	4.2.4f	Analytical techniques		
16	3b(ii)	2	AO3	4.2.4g	Analytical techniques		

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16	3c(i)	1	AO1	4.1.1b(iii)	Basic concepts and hydrocarbons		
16	3c(ii)	2	AO3	4.2.4f,g	Analytical techniques		
17	4a	3	AO2	2.1.3e(ii)	Amount of substance	Rate interetation for reaction of metal and acid (with graph), collision theory and catalysts	
17	4bi	1	AO2	3.2.2e, 1.1.3a,d(i)	Reactions rates		
17	4bii	1	AO2	3.2.2e, 1.1.4b	Reactions rates		
17	4biii	1	AO3	3.2.2e, 1.1.3a	Reactions rates		
17	4c	2	AO2	2.1.3e(ii), 3.2.2a	Amount of substance, Reactions rates		
17	4d	2	AO1	3.2.2a	Reactions rates		
17	4e(i)	2	AO1	3.2.2c(i),(ii)	Reactions rates		
17	4e(ii)	1	AO2	3.2.2d(i)	Reactions rates		
18	5a(i)	3	AO1	4.1.1b(iv), 4.1.3f(i),(ii),(iii)	Basic concepts and hydrocarbons, Alkenes	Reactions of alkenes, alkene preparation from an alcohol (practical) and polymers	
18	5a(ii)	1	AO1	4.1.3f(i)	Alkenes		
18	5a(iii)	1	AO1	4.1.3f(ii)	Alkenes		
18	5b(i)	6	AO2, AO3	2.1.3h(i), 4.2.3a(i),(ii), 1.1.1a, 1.1.3b	Amount of substance, Organic synthesis		
18	5b(ii)	2	AO3	4.2.1d	Alcohols		
18	5c(i)	1	AO2	4.1.3j(i)	Alkenes		
18	5c(ii)	2	AO1	4.1.3k(i)(ii)	Alkenes		