

Unit Code: H433/01
Qual Name: GCE Chemistry B

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject
1	1	1	AO1	EL a	Atomic structure	MCQ
1	2	1	AO2	EL f	Electronic structure	MCQ
1	3	1	AO1	EL g	History of atomic structure	MCQ
1	4	1	AO2	EL k	Bond angles	MCQ
1	5	1	AO2	EL b	Moles	MCQ
1	6	1	AO2	EL c (i)	Moles in solution	MCQ
1	7	1	AO1	EL h	Fusion reactions	MCQ
1	8	1	AO2	EL s,t	Salt making	MCQ
1	9	1	AO2	EL w	Emission spectra	MCQ
1	10	1	AO1	EL e, f	P-orbitals	MCQ
1	11	1	AO1	EL g	Atomic structure	MCQ
1	12	1	AO2	EL b l, c i	Moles	MCQ
1	13	1	AO1	Ela	Atomic structure	MCQ
1	14	1	AO1	EL j	Structure and bonding	MCQ
1	15	1	AO2	EL bi, 1.1.3a,b	Hydrated salt formula	MCQ
1	16	1	AO2	EL ci	Moles in solution	MCQ
1	17	1	AO2	EL b i 1.1.3a,b	Hydrated salt mass	MCQ
2	1	1	AO2	DF p	Polymers	MCQ
2	2	1	AO1	DF k, u	Exhaust emissions	MCQ
2	3	1	AO1	DF e	Bond enthalpies	MCQ
2	4	1	AO2	DF m, s	Naming organic molecules	MCQ
2	5	1	AO1	DF k	Oxides of nitrogen pollution	MCQ
2	6	1	AO2	DF a	Gas volumes	MCQ
2	7	1	AO1	DF m	Naming organic molecules	MCQ
2	8	1	AO2	DF n	Equations of combustion	MCQ
2	9	1	AO2	DF a	Gas volumes	MCQ
3	1	1	AO1	CI j (iv), ES e	Redox	MCQ
3	2	1	AO1	ES b	Halogen displacements	MCQ

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3	3	1	AO1	ES g	Systematic names	MCQ
3	4	1	AO1	ES c	Electrolysis	MCQ
3	5	1	AO1	ELs L, 1.1.3 a	Analysis	MCQ
3	6	1	AO2	ES a	Atom economy	MCQ
3	7	1	AO1	Es g	Systematic names inorganic substances	MCQ
3	8	1	AO1	ES b, e, m, DMc	Redox, halogens	MCQ
4	1	1	AO1	OZ a	Electronegativity	MCQ
4	2	1	AO1	OZ a	Dipoles	MCQ
4	3	1	AO1	OZ m	Nucleophilic substitution	MCQ
4	4	1	AO1	OZ e, g, h	Enthalpy profiles	MCQ
4	5	1	AO1	OZ l, n	Nucleophilic substitution	MCQ
4	6	1	AO2	OZi	Gas concentration in ppm	MCQ
4	7	1	AO1	ES h,m, OZ n	Reactivity of R-hal	MCQ
4	8	1	AO2	OZ i	Gas concentration ppm and %	MCQ
4	9	1	AO1	OZ n	Hydrolysis of R-hal	MCQ
4	10	1	AO1	OZ t	Electromagnetic radiation and bonds	MCQ
5	1	1	AO1	WM f	Distillation and reflux	MCQ
5	2	1	AO1	WM i (i), (ii)	Mass spectrometry	MCQ
5	3	1	AO1	WM d, f, P1.1.2	Organic purification	MCQ
5	4	1	AO2	WM h	Dehydration of alcohols	MCQ
5	5	1	AO1	WM g	Green chemistry	MCQ
5	6	1	AO1	PL h, WM ci	Alcohols and acids	MCQ
6	1	1	AO1	CI j (iii)	Test for nitrate ions	MCQ
6	2	1	AO2	CI e	Rate equations	MCQ
6	3	1	AO1	CI k i	By-products	MCQ
6	4	1	AO2	CI e	Rate of reaction	MCQ
6	5	1	AO2	CI d	Arrhenius equation	MCQ
6	6	1	AO1	CI k	Equilibrium conditions	MCQ
6	7	1	AO1	CI e, PL f	Enzyme catalysed reactions	MCQ
6	8	1	AO2	DF a, CIh	Equilibrium concentrations	MCQ
7	1	1	AO1	PL c (i), (iii)	DNA	MCQ
7	2	1	AO1	PL b	Protein structure	MCQ
7	3	1	AO1	PL f	Enzymes	MCQ

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7	4	1	AO1	PL n	Ester formation	MCQ
7	5	1	AO2	PL m	Ester and amide hydrolysis	MCQ
7	6	1	AO1	PL j	Amines	MCQ
7	7	1	AO2	PL h	Amino acids	MCQ
7	8	1	AO1	PL g	Enzymes	MCQ
7	9	1	AO1	PL i	Amino acids	MCQ
8	1	1	AO2	O h	Solubility product	MCQ
8	2	1	AO1	O n (i), (ii), (iv)	Greenhouse effect	MCQ
8	3	1	AO2	O j	pH	MCQ
8	4	1	AO1	EL r, O c	Group II inc lattice enthalpy	MCQ
8	5	1	AO2	O g	Entropy	MCQ
8	6	1	AO2	O l iii	pH	MCQ
8	7	1	AO1	O n	Greenhouse effect	MCQ
8	8	1	AO2	O h	Solubility product	MCQ
9	1	1	AO2	DM f	Electrode potentials	MCQ
9	2	1	AO2	DM m	Coloured ions	MCQ
9	3	1	AO1	DM f	Rusting	MCQ
9	4	1	AO2	DM b	Complex ions	MCQ
9	5	1	AO1	DM n, P1.1.2	Colorimetry	MCQ
9	6	1	AO1	DM b,j	Complex ions	MCQ
9	7	1	AO1	DM i, mi	Transition metal ions and NaOH	MCQ
9	8	1	AO1	DM n 1.1.2a	Colorimetry	MCQ
9	9	1	AO1	DM k, 1.1.3a	Precipitates with ammonia solution	MCQ
10	1	1	AO1	CD n	Gas chromatography	MCQ
10	2	1	AO2	CD c, Elb(i)	Unsaturated carboxylic acids	MCQ
10	3	1	AO1	WM d, CD i	Oxidation of alcohols and carbonyls	MCQ
10	4	1	AO1	CD d I, ii, eii	Benzene reactions	MCQ
10	5	1	AO2	CD ei, ii	Benzene structure	MCQ
10	6	1	AO1	CD n	Gas chromatography	MCQ
11	1(a)	2	AO1	ES O	Dynamic equilibrium	
11	1(b)	3	AO2	ES p, Cl, h	Calculation of equilibrium concentrations	
11	1(c)	2	AO3	ES q	Le Chatelier	
11	1(d)(i)	6	AO3	ES q, Cl f, g	Optimum industrial operating conditions	

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11	1(d)(ii)	3	O1 x2, AO2x	O e,f	Entropy and temperature qualitative	
12	2(a)	3	AO1	PL ci, ii	DNA structure	
12	2(b)	3	AO1	Oz c, PL ciii, PL d	H-bonds in base pairs	
12	2(c)	2	AO2	Plai	Protein structure	
12	2(d)	6	O2x2, AO3x	PL ai, e, g	Enzyme action extended writing	
13	3(a)	3	AO2	OZ ri, t, u	Calc of bond enthalpy from wavelength	Maths skills
13	3(b)	1	AO1	OZ o,p iii	Bond fission and half arrows	
13	3(c)	2	AO1	OZ p	Free radical mechanism	
13	3(d)(i)	2	AO2	DF a	Use of $pV = nRT$	Maths skills
13	3(d)(ii)	2	AO2	DF a	Use of $pV = nRT$ and sig figs	Maths skills
13	3(e)(i)	2	AO1	DF k	Formation of NO in a car engine	
13	3(e)(ii)	1	AO1	Cl j ii	Appearance of Nox	
13	3(f)(i)	1	AO1	OZ rii, WM a, CD i (iii)	Formation of aldehydes with ozone and fuel	
13	3(f)(ii)	1	AO2	CD i (iii)	reaction of CN- with aldehyde	
14	4(a)	2	AO2	EL h	Nuclear fusion	
14	4(b)	3	AO2	ELi, k	Shapes of molecules	
14	4(c)	3	AO2	DF g	Hess cycle	
14	4(d)	1	AO1	EL fii	Electronic cofiguration of chloride ion	
14	4(e)(i)	1	AO1	ES f	iodine thiosulfate titration	
14	4(e)(ii)	2	AO2	Dma, Esf	Titration calculation	
14	4(e)(iii)	1	AO2	1.1.4 d	% uncertainty	
14	4(e)(iv)	2	AO3	ELcii 1.1.1 c1.1.4 d, e	Making up volumetric solutions	
15	5(a)	1	AO1	ELcii 1.1.1 c1.1.4 d, e	organic analysis	
15	5(b)	1	AO1	DF l	Meaning of aromatic	
15	5(c)	1	AO1	WM c ii	Test for phenol	
15	5(d)(i)	3	AO1	WM d ii, CD i ii, 1.1.1 a	oxidation of alcohol and carbonyl	
15	5(d)(ii)	1	AO1	WM a CDf	skeletal formula	
15	5(e)(i)	1	AO1	DF o iii	Hydrogenation of alkene	
15	5(e)(ii)	2	AO2	WM c iii, PL n	Esterification of phenols	
15	5(f)(i)	2	AO1	DF o iv, WM d iii, CD j	Dehydration alcohols/ hydration of alkenes	
15	5(f)(ii)	2	AO3	WM diii 1.1.4 c	Comments on practical procedure	
15	5(g)(i)	2	AO1	DFo ii DFq	Electrophilic addn mechansim	
15	5(g)(ii)	3	AO3	DF q	Electrophilic addn in the presence of other ions	

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16	6(a)	3	AO2	EL b, DF j	cracking and % yield	
16	6(b)(i)	1	AO1	DF f	Calorimetry	
16	6(b)(ii)	1	AO1	DF f 1.1.1a	Calorimetry	
16	6(b)(iii)	2	AO3	DFf 1.1.4c	Calorimetry	
16	6(c)	2	AO2	DF g	Hess cycle	
16	6(d)	2	AO2	WM b, PL s	¹³ C NMR	
16	6(e)(i)	1	AO1	WMd ii	Oxidation alcohols	
16	6(f)	4	AO1	CD k	Mechanism, nucleophilic addn carbonyls	
16	6(g)	6	AO3	PL r ii, s, t	Interpreting spectra	
17	7(a)	1	AO1	PL b	Protein structure	
17	7(b)	1	AO1	PL b	Enzyme substrate bonding	
17	7(c)(i)	1	AO1	PL qii	Chiral centres	
17	7(c)(ii)	4	AO2	Plai	Protein hydrolysis	
17	7(d)	6	AO1x3, 2x3	PL a 1.1.1, 1.1.2a	Chromatography of amino acids	
18	8(a)(i)	1	AO3	PL m, 1.1.1a	Hydrolysis of esters	
18	8(a)(ii)	2	AO3	PL m, 1.1.1a	Isolation of ester hydrolysis products	
18	8(a)(iii)	1	AO1	PL n	Esterification with ethanoyl chloride	
18	8(b)	2	AO1	PL o,p	polymerisation	
19	9(a)	1	AO2	OZ p	NO radicals and bonding	
19	9(b)(i)	1	AO1	OZ pi	radical mechanism	
19	9(b)(ii)	1	AO2	OX p	Overall equation from several steps	
19	9(c)	3	AO2, AO3	OZ s,u	UV radiation and bond breaking calc	
20	10(a)	2	AO3	EL cii 1.1.2	Making a volumetric solution	
20	10(b)	3	AO2	DM a	Manganate(VIII) titration	
20	10(c)(i)	2	AO1	DM f iii	Rusting half equations	
20	10(c)(ii)	1	AO2	DM k	Identification of ppts	
20	10(c)(iii)	1	AO2	DM f iii	Electrochemistry of rusting	
20	10(d)	1	AO1	DM h	electron configuration	
20	10(e)	2	AO1	DM fii	Feasability of reactions using Eo	
20	10(f)(i)	1	AO2	Dmi	Ligand substitution	
20	10(f)(ii)	2	AO2	DM j, ELb	Formula of complex ion	
21	11(a)	1	AO1	Cl j(i)	Unreactivity of nitrogen	
21	11(b)(i)	1	AO1	O g,	Entropy of system calculation	

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21	11(b)(ii)	1	AO3	O d,e	Qualitative entropy change explanation	
21	11(c)	2	AO2	O f	#REF!	
21	11(d)	3	AO3	WM g, Cl g, k(i)	rate and eqm optimum operating condns	
21	11(e)	3	AO2	ES p, Cl h	Calculation of Kc	
21	11(f)(i)	1	AO1	EL d, ESf, Clj	deriving an equation	
21	11(f)(ii)	4	AO2	EL bi, Clj(iii)i	complex yield calculation	
21	11(f)(iii)	2	AO1	Cl jiv	Identification of nitrate ions	
22	12(a)	2	AO1	ES b, c (ii)	Electrolysis of sea water	
22	12(b)	3	AO2	EL b (i)	Mole calculation and sig figs	
22	12(c)	1	AO1	ES h, n	Hazards of transporting chlorine	
22	12(d)(i)	2	AO1	OZ o, p (ii), (iii)	Mechanism of radical formation	
22	12(d)(ii)	2	AO1	OZ p ii	radical mechanism	
22	12(d)(iii)	3	AO1	OZ q, h	Catalytic break down of ozone	
22	12(d)(iv)	2	AO2	OZ u	Calculation of wavelength from bond enthalpy	
22	12(e)	1	AO1	ES I ELd	Preparation of hydrogen chloride	
22	12(f)	2	AO2	ES e, f, l	Redox Conc sulfuric acid and KI	
23	13(a)	1	AO1	EL m	Periodicity	
23	13(b)	2	AO1	EL r	Thermal stability of group 2 carbonates	
23	13(c)	3	AO2	EL a, u, DF a	pV=nRT calculation	
23	13(d)	6	AO1 and 2	#REF!	EL w (i), (iii)	
23	13(e)	3	AO3	ES s P1.1.1, 1.1.3	Chemical analysis	
24	14(a)	2	AO2	ES q, Cl f	Effect of conditions on equilibrium	
24	14(b)	3	AO2	Cl h	Calculation of equilibrium constant	
24	14(c)(i)	1	AO2	O e (ii),	Qualitative entropy change	
24	14(c)(ii)	2	AO2	O g	Calculation of entropy change	
24	14(d)	2	AO3	O f	Min temp for a feasible reaction	
24	14(e)(i)	1	AO1	ES a	Atom economy	
24	14(e)(ii)	1	AO1	Cl k (i)	co-products	
24	14(f)	2	AO3	Cl k(ii)	Sustainability	
25	15(a)(i)	4	AO1	EL k, CD e(i)	Structure of benzene	
25	15(a)(ii)	2	AO3	CD d, e (ii)	delocalisation in benzene	
25	15(b)(i)	2	AO1	CD g (ii)	Nitration of benzene	
25	15(b)(ii)	4	AO2	CD h, 1.1.1a	Formation of diazonium salt	

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25	15(c)	1	AO1	CD b (ii)	sulfonate	
26	16 (a)	6	AO3	EL a, p s, 1.1.1 a, c, 1.1.4 a, d, e	Finding formula of an hydrated salt	
26	16(b)	4	O1x2, AO2x	DF f, g, O b (iii)	Hess cycle	
26	16(c)	2	AO1, AO2	O b (i), (ii)	Lattice enthalpy calculation	
26	16(d)	2	AO3	EL s, O a, b(i)	Lattice enthalpy and solubility	