Unit Code: J258/01
Qual Name: GCSE Chemistry B (Twenty First Century Science)
Qual Title: Breadth in chemistry (Foundation)
Tier: Foundation

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	**Question Subject**, If required	Additional Notes/Comments	Maths Skills	Practical Assessment Skills
1	1a	1	1	1.3.3	Evidence for climate change	Greenhouse effect			
1	1bi	1	3	1.3.5	Evidence for climate change	Greenhouse effect	Requires Table from (b)	Y	
1	1bii	1	2	1.3.5	Evidence for climate change	Greenhouse effect	Requires Table from (b)	Y	
1	1c	3	1	1.1.9/3.4.8	Materials from Crude oil	Greenhouse effect			
2	1a	2	1 and 3	1.2.1/7	Temperature changes in chemical reactions	Endothermic reaction	Needs stem of 1		
2	1b	3	1	1.2.2	Temperature changes in chemical reactions	Endothermic reaction	Needs stem of 1 and (a)		
3	1ai	1	1	1.1.9	Changes in teh Earth's atmosphere	Ammonium sulfate fertiliser			
3	1aii	1	1	6.4.1	Industrial manufacture of chemicals	Ammonium sulfate fertiliser	Formula from (a)(i) required		
3	1bi	1	3	6.4.2b/2c	Industrial manufacture of chemicals	Ammonium sulfate fertiliser			
3	1bii	1	3	6.4.2b/2c	Industrial manufacture of chemicals	Ammonium sulfate fertiliser			
3	1ci	3	1 and 2	5.2.4b	Finding the composition of unknowns	Ammonium sulfate fertiliser	Needs (c)		Y
3	1cii	1	1	6.1.2	Products from acids	Ammonium sulfate fertiliser			Y
3	1d	3	1 and 2	5.3.8	Calculating amounts of substance	Ammonium sulfate fertiliser		Y	
4	1a	3	1	2.2.6	Elements in the Periodic Tabke	Halogens and their reactions			
4	1bi	2	2	2.4.1/6.1.3	Using equations	Halogens and their reactions	Needs (b)		
4	1bii	1	2	2.2.6	Elements in the Periodic Tabke	Halogens and their reactions	Needs parts (b) and (b)(i)		
5	1a	1	1	2.2.4	Elements in the Periodic Table	Identifying elements from their properties	Table 5.1 required (Question stem)		
5	1b	1	2	1.1.4	Changes in the Earth's atmosphere	Identifying elements from their properties	Table 5.1 required (Question stem)		
5	1c	2	2	2.3.1	Metals and non-metals combining	Identifying elements from their properties	Table 5.1 required (Question stem)		
5	1d	1	2	2.3.6	Metals and non-metals combining	Identifying elements from their properties	Table 5.1 required (Question stem)		
5	1e	1	1	2.3.7	Metals and non-metals combining	Identifying elements from their properties			
6	1a	3	1	3.3.1	Electrolysis	Electrolysis of sodium chloride solution			

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6	1b	3	1	3.3.3/1.1.12 /1.4.2	Electrolysis	Electrolysis of sodium chloride solution	Needs (a)		Y
7	1ai	1	1	3.2.4	Extraction of metals	Metal structure and reactivity			
7	1aii	4	1 and 2	3.2.4	Extraction of metals	Metal structure and reactivity	Needs 1ai		
7	1bi	1	1	4.1.3	Choosing materials	Metal structure and reactivity	Needs stem to 1		
7	1bii	1	1	3.1.1	Metal structure	Metal structure and reactivity			
8	1a	1	1	5.4.6	Measuring amounts of chemicals in solution	Magnesium hydroxide curing indigestion	Stem to Q1 needed		
8	1bi	2	3	5.3.8	Calculating amounts of substances	Magnesium hydroxide curing indigestion	Needs (b)	Y	
8	1bii	1	2	5.4.7	Measuring amounts of chemicals in solution	Magnesium hydroxide curing indigestion	Needs (b)		Y
9	1a	2	3	4.1.1/4.1.2	Choosing materials	Polymer properties	Table 9.1 needed		
9	1b	2	3	4.2.2	Polymer types	Polymer properties	Table 9.1 needed		
9	1c	1	2	4.3.1	Bonding and structure in materials	Polymer properties			
10	1a	1	1	3.4.16	Materials from crude oil	Cracking crude oil fractions	Needs Q1 stem		
10	1b	2	1	3.4.2	Materials from crude oil	Cracking crude oil fractions			
10	1ci	1	2	3.4.7	Materials from crude oil	Cracking crude oil fractions	Needs (c)	Y	
10	1cii	1	2	4.3.2	Bonding and structure in materials	Cracking crude oil fractions	Needs (c) and (c)(i)		
10	1ciii	1	2	3.4.17	Materials from crude oil	Cracking crude oil fractions	Needs (c)		
11	1a	1	1	4.4.1	Uses of nanoparticles	Nanoparticles in cerium oxide	Needs stem to 1		
11	1b	2	1	4.4.2	Uses of nanoparticles	Nanoparticles in cerium oxide	Needs stem to 1		
11	1c	2	1	1.1.7	Changes in the Earth's atmosphere	Nanoparticles in cerium oxide			
11	1di	1	2	6.1.3	Products from acids	Nanoparticles in cerium oxide			
11	1dii	3	1	5.3.8	Calculating amounts of substances	Nanoparticles in cerium oxide		Y	
12	1a	2	2	6.2.10,11,1 2	Controlling rate of Reaction	Rate of reaction of carbonate with acid	Needs stem to 1 Overlap item with HT	Y	
12	1b	2	3	6.2.1	Controlling rate of Reaction	Rate of reaction of carbonate with acid	Needs stem to 1 Overlap item with HT		Y
12	1c	2	2	6.2.2	Controlling rate of Reaction	Rate of reaction of carbonate with acid	Needs stem to 1 Overlap item with HT		
12	1d	3	1 and 2	5.3.8, 6.1.1	Calculating amounts of substances	Rate of reaction of carbonate with acid	Needs stem to 1 Overlap item with HT	Y	
13	1a	2	3	6.2.2	Controlling rates of reaction	Heating magnesium carbonate	Needs stem to 1 Overlap item with HT		
13	1b	4	1 and 2	6.4.6	Making Industrial Chemicals	Heating magnesium carbonate	Needs stem to 1 Overlap item with HT	Y	
13	1ci	1	2	5.3.1,2	Calculating amounts of substance	Heating magnesium carbonate	Needs stem to 1 and (c) Overlap item with HT		

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13	1cii	1	2	5.3.12	Calculating amounts of substance	Heating magnesium carbonate	Needs stem to 1, (c) and part c(i) Overlap item with HT	Y	
13	1d	2	1	2.3.8	Metals and non-metals combining	Heating magnesium carbonate	Overlap item with HT		
14	1a	1	1	1.4.2	Water supply	Chlorine in drinking water			Y
14	1b	3	1	1.4.1	Water supply	Chlorine in drinking water	Needs stem to 1		
14	1c	2	1	3.4.9,10	Materials from crude oil	Chlorine in drinking water			
15	1ai	2	1	3.4.8,9,11	Materials from Crude oil	Butane structure and formula	Needs Fig 2.1 and (a)		
15	1aii	1	1	3.4.8,12	Materials from Crude oil	Butane structure and formula	Needs Fig 2.1		
15	1b	2	1	3.4.8-11	Materials from Crude oil	Butane structure and formula	Needs Fig 2.1	Y	
15	1c	3	1 and 2	5.3.8	Calculating amount of substance	Butane structure and formula		Y	
16	1ai	1	2	4.5.5,1.3.5	Products at end of life	Life cycle of LED lamp	Needs stem to 1		
16	1aii	2	2	4.5.5,1.3.5	Products at end of life	Life cycle of LED lamp	Needs stem to 1	Y	
16	1b	1	1	4.5.4	Products at end of life	Life cycle of LED lamp	Needs stem to 1		
16	1c	2	2	4.5.5, 5.3.8	Products at end of life	Life cycle of LED lamp	Needs stem to 1	Y	
17	1a	1	1	1.1.10	Changes to the Earth's atmosphere	Hydrogen fuel cells	Needs stem to 1		
17	1b	2	1	1.2.9	Temperature changes in Chemical reactions	Hydrogen fuel cells	Needs stem to 1		
17	1ci	1	1	1.2.2	Temperature changes in Chemical reactions	Hydrogen fuel cells	Needs (c)		
17	1cii	1	2	1.2.4	Temperature changes in Chemical reactions	Hydrogen fuel cells	Needs (c)		
17	1di	1	2	5.3.3	Calculating amounts of substance	Hydrogen fuel cells			
17	1dii	2	2	1.2.6,5.3.8	Calculating amounts of substance	Hydrogen fuel cells		Y	
18	1a	2	3	1.1.4	Changes in the Earth's atmosphere	Properties of gallium	Needs Q1 stem		
18	1b	1	1	2.2.3	Elements in the Periodic Table	Properties of gallium	Needs Q1 stem		
18	1c	1	2	2.3.3	Metals and non-metals combining	Properties of gallium			
18	1d	2	1	2.3.10	Metals and non-metals combining	Properties of gallium			
18	1e	2	1	2.2.9,2.2.5	Elements in the Periodic Table	Properties of gallium			Y
19	1ai	1	1	3.2.1	Extraction of metals	Reactivity of metals	Needs stem to 1		Y
19	1aii	1	2	3.2.2	Extraction of metals	Reactivity of metals	Needs stem to 1 and (a)(i)		Y
19	1b	1	2	3.2.1	Extraction of metals	Reactivity of metals			
19	1c	2	1	3.1.1	Metallic structure	Reactivity of metals			
19	1d	2	1	3.1.2	Metallic structure	Reactivity of metals			
20	1a	1	1	2.1.1,2.1.2	Ideas about atoms	Ideas about atoms	Needs stem to 1		
20	1b	1	1	2.1.2	Ideas about atoms	Ideas about atoms	Needs stem to 1		
20	1c	2	1	2.1.3	Ideas about atoms	Ideas about atoms			

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20	1d	2	2	2.1.7	Ideas about atoms	Ideas about atoms			
20	1e	2	3	2.1.4,5,6	Ideas about atoms	Ideas about atoms			
21	1ai	2	2	6.1.1,6.2.11	Controlling rate of reaction	Reaction of sodium hydrogencarbonate and acid	Need stem to 1	Y	Y
21	1aii	1	3	6.2.8	Controlling rate of reaction	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and answer to (a)(i)	Y	Y
21	1aiii	1	1	6.2.8,6.2.11	Controlling rate of reaction	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and answer to (a)(i)		Y
21	1bi	1	3	6.2.11	Controlling rate of reaction	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and answer to (a)(i)	Y	Y
21	1bii	1	3	6.2.11	Controlling rate of reaction	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and answer to (a)(i)	Y	Y
21	1biii	1	2	5.3.1,5.3.2	Calculating amounts of substances	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and answer to (a)(i)		Y
21	1c	2	3	5.4.7	Measuring amounts of substances in solution	Reaction of sodium hydrogencarbonate and acid	Need stem to 1		Y
21	1di	1	3	5.4.8	Measuring amounts of substances in solution	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and (c)		Y
21	1dii	1	2	5.3.8,5.4.8	Calculating amounts of substances	Reaction of sodium hydrogencarbonate and acid	Need stem to 1 and (d)(i)	Y	Y
22	1a	1	2	2.4.3,6.1.1, 1.1.10	Changes in the Earth's atmosphere	Reaction of zince with sulfuric acid	Needs stem to 1		Y
22	1b	1	1	6.1.1	Products from acids	Reaction of zince with sulfuric acid	Needs stem to 1 and (a)		
22	1c	1	2	6.2.3	Controlling rates of reaction	Reaction of zince with sulfuric acid	Needs stem to 1 and (b)		
22	1d	2	1	6.2.4,5,6	Controlling rates of reaction	Reaction of zince with sulfuric acid	Needs stem to 1 and (a) and 1b)		
23	1a	2	1	6,3,1,2	Factors affecting yield	Manufacture of NO.	Needs stem to 1		
23	1b	1	1	6.4.1	Inustrial manufacture of chemicals	Manufacture of NO.	Needs stem to 1		
23	1c	2	2	5.3.12	Calculating the amounts of substances	Manufacture of NO.	Needs stem to 1	Y	
24	1ai	1	1	4.3.6	Effect of bonding and structure on properties	Diamond and graphite compared	Need stem to 1 Overlap item with HT		
24	1aii	2	2	4.3.6	Effect of bonding and structure on properties	Diamond and graphite compared	Need stem to 1 Overlap item with HT		
24	1b	2	2	5.3.8	Calculating amounts of substance	Diamond and graphite compared	Overlap item with HT	Y	
24	1ci	2	2	5.3.8,5.3.11	Calculating amounts of substance	Diamond and graphite compared	Needs (c) Overlap item with HT	Y	
24	1cii	2	3	4.3.6	Effect of bonding and structure on properties	Diamond and graphite compared	Needs stem to 1 and Figs 11.1 and 11.2 Overlap item with HT		
25	1ai	1	1	5.1.6b	Separation and purity testing	Chromatography of a black dye	Needs 1 stem and (a) Overlap item with HT		Y
25	1aii	1	2	5.1.4,6	Separation and purity testing	Chromatography of a black dye	Needs 1 stem and (a) Overlap item with HT		Y

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25	1bi	1	1	5.1.4,6	Separation and purity testing	Chromatography of a black dye	Needs 1 stem, a(ii) and b Overlap item with HT		Y
25	1bii	2	3	5.1.6	Separation and purity testing	Chromatography of a black dye	Needs a(ii) and b Overlap item with HT		Y
25	1biii	2	1 and 2	5.1.5	Separation and purity testing	Chromatography of a black dye	Needs b Overlap item with HT		Y
25	1c	1	3	5.1.2	Separation and purity testing	Chromatography of a black dye	Needs 1 stem and b Overlap item with HT		
25	1d	1	2	5.1.3	Separation and purity testing	Chromatography of a black dye	Needs 1 stem and b Overlap item with HT		Y
26	1ai	1	1	4.3.2,3.4.8, 3.4.17,3.4.1	Materials from Crude Oil	Aluminium and polyporpene cups	Needs (a)		
26	1aii	1	2	4.2.2	Polymer types	Aluminium and polyporpene cups	Needs (a) and (a)(i)		
26	1bi	2	1	3.1.1	Metallic structure	Aluminium and polyporpene cups	Needs (b)		
26	1bii	1	1	3.1.2	Metallic structure	Aluminium and polyporpene cups	Needs (b) and (b)(i)		
26	1c	1	2	4.1.1, 4.1.2	Choosing materials	Aluminium and polyporpene cups	Needs stem to 1, (a) and (b)		
27	1ai	1	3	1.3.5	Evidence for climate change	CO2 levels and climate change	Needs Fig 2.1 in stem to 1		
27	1aii	2	2	1.3.5	Evidence for climate change	CO2 levels and climate change	Needs Fig 2.1 in stem to 1	Y	
27	1aiii	2	3	1.3.5	Evidence for climate change	CO2 levels and climate change	Needs Fig 2.1 in stem to 1	Y	
27	1bi	1	1	1.3.1	Evidence for climate change	CO2 levels and climate change	Needs (b)		
27	1bii	2	1	1.3.2,4	Evidence for climate change	CO2 levels and climate change	Needs (b)		
28	1a	1	1	2.4.1	Using equations	Ethene formula and reactions	Needs stem to 1		
28	1b	1	2	3.4.6	Materials from Crude Oil	Ethene formula and reactions	Needs stem to 1	Y	
28	1c	1	1	3.4.16	Materials from Crude Oil	Ethene formula and reactions	Needs stem to 1		
28	1d	3	1	3.4.18	Materials from Crude Oil	Ethene formula and reactions			Y
29	1ai	1	1	4.3.7	Effect of bonding and structure of materials	Structures of graphite, diamond and sodium chloride	Needs Fig 4.1 from Q4 stem		
29	1aii	1	1	4.3.5	Effect of bonding and structure of materials	Structures of graphite, diamond and sodium chloride	Needs Fig 4.1 from Q4 stem		
29	1b	2	1	2.3.9,4.3.6	Metals and non-metals combining	Structures of graphite, diamond and sodium chloride	Needs Fig 4.1 from Q4 stem		
30	1ai	2	1	2.2.4,2.2.6, 2.2.7,2.2.5	Elements in the Periodic Table	Lithium batteries and lithium compounds	Needs (a)		
30	1aii	2	2	5.3.8,5.3.11	Calculating amounts of substances	Lithium batteries and lithium compounds		Y	
30	1aiii	1	1	2.2.4-7	Elements in the Periodic Table	Lithium batteries and lithium compounds			Y
30	1b	2	2	3.3.2	Electrolysis	Lithium batteries and lithium compounds			

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30	1c	1	1	1.2.8	Temperature changes in chemical reactions	Lithium batteries and lithium compounds	Needs 1 stem		
31	1ai	2	2	4.5.1	Products at end of life	Rusting of Iron	Needs stem to 1		Y
31	1aii	1	3	4.5.1	Products at end of life	Rusting of Iron	Needs stem to 1		Y
31	1aiii	1	3	4.5.1	Products at end of life	Rusting of Iron	Needs stem to 1 and (a)(ii)		Y
31	1b	1	2	5.2.4a	Finding the composition of unknowns	Rusting of Iron	Needs stem to 1		Y
31	1c	2	2	6.1.1	Products from acids	Rusting of Iron		Y	Y
32	1ai	1	1	5.2.2	Finding composition of unknowns	Identifying a fertiliser	Needs (a()		Y
32	1aii	1	1	6.4.1	Industrial manufacture of chemicals	Identifying a fertiliser	Needs (a) and (a)(i)		
32	1b	1	2	6.1.3	Products from acids	Identifying a fertiliser	Needs (a)		Y
32	1ci	1	1	5.2.4	Finding composition of unknowns	Identifying a fertiliser	Needs (b) and (c)		Y
32	1cii	1	1	1.1.10,5.2.4	Changes in the atmosphere	Identifying a fertiliser	Needs (b) and (c)		
32	1di	1	3	5.2.5,5.2.7	Finding composition of unknowns	Identifying a fertiliser	Needs (d)		
32	1dii	1	1	5.2.5	Finding composition of unknowns	Identifying a fertiliser	Needs (d)	Y	
32	1e	2	3	5.2.6	Finding composition of unknowns	Identifying a fertiliser			
33	1a	1	1	2.5.1	Transition metals	Manufacture of titanium	Needs Stem to Q1		
33	1b	3	2	3.2.1,4.5.2	Extraction of metals	Manufacture of titanium			
33	1c	1	1	5.3.3	Calculating amounts of substance	Manufacture of titanium			
33	1d	2	2	5.3.8	Calculating amounts of substance	Manufacture of titanium	Needs (c)	Y	
33	1ei	3	1 and 2	6.4.6,6.4.7	Industrial manufacture of chemicals	Manufacture of titanium	Needs (b)	Y	
33	1eii	2	2	6.4.5,5.4.7	Industrial manufacture of chemicals	Manufacture of titanium	Needs (e)(i)		
33	1fi	2	1	2.3.8,2.3.12	Metals and non-metals combining	Manufacture of titanium	Needs (b) and (f)		
33	1fii	1	1	3.2.3	Extraction of metals	Manufacture of titanium			
34	1a	3	1	6.3.1,2	Factors affecting yield	Ammonium sulfate			
34	1b	2	3	6.1.2	Products from acids	Ammonium sulfate			Y
34	1c	2	2	5.3.12	Calculating amounts of substances	Ammonium sulfate		Y	Y
34	1d	2	3	5.1.1,2	Separation and purity testing	Ammonium sulfate	Needs stem to Q1		Y
35	1a	1	1	5.4.4	Measuring amounts of substances in solution	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1		
35	1bi	2	1	5.4.7	Measuring amounts of substances in solution	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1 and (b)		Y
35	1bii	1	3	5.4.7	Measuring amounts of substances in solution	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1 (b) and (b)(i)		Y
35	1ci	1	2	5.3.8,5.4.7	Calculating amounts of substance	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1 and b(ii)		Y
35	1cii	2	1 and 3	5.4.7,8, 5.3.8	Measuring amounts of substances in solution	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1), and (b)(ii)	Y	Y

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35	1ciii	4	1 and 2	5.3.8	Calculating amounts of substance	Titration of sodium hydroxide with hydrochloric acid	Needs stem to Q1), b(ii) and (c)(ii)	Y	Y
36	1ai	1	3	6.2.7	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1 and (a) Overlap item with HT		Y
36	1aii	2	1	6.2.3	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1 and (a) Overlap item with HT		
36	1b	1	1	6.2.2	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1 Overlap item with HT		
36	1ci	1	2	6.2.7,8	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1 and (c) Overlap item with HT		Y
36	1cii	1	2	6.2.8	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1 and (c) Overlap item with HT		Y
36	1ciii	1	2	6.2.8	Controlling rates of reaction	Rate of reaction of tablets with water	Needs stem to Q1, (c) and (c) (ii) Overlap item with HT		Y