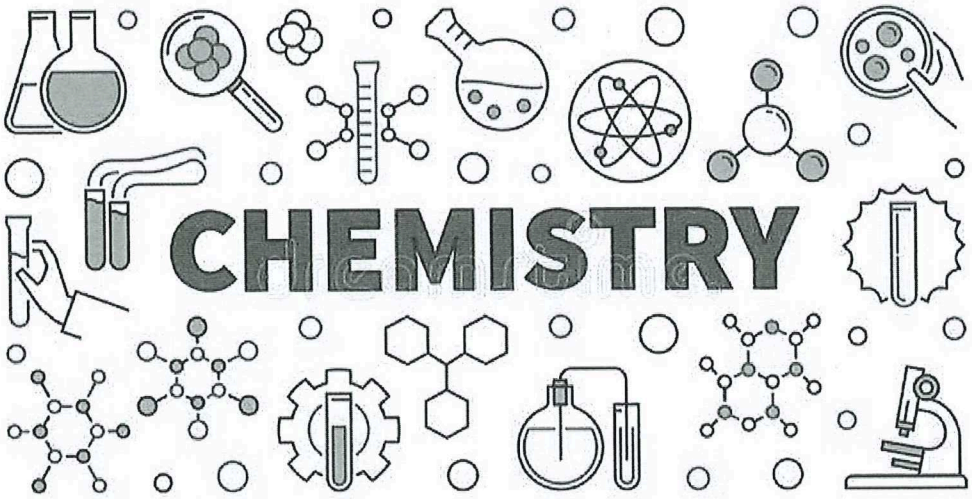
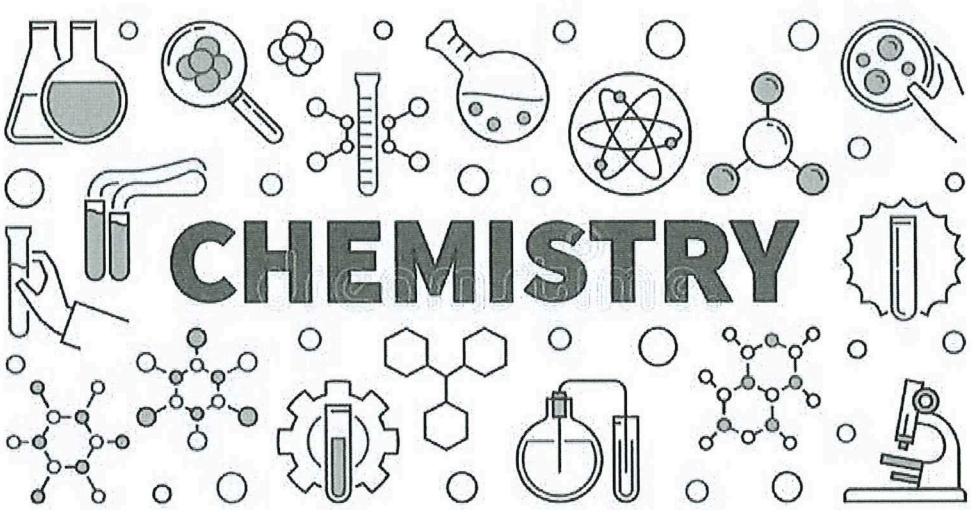


WJEC Chemistry 1

Option – Higher Tier

Mark Scheme



WJEC Chemistry 1

Option – Higher Tier

1.1 Mark Scheme

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)	(i)		maximum possible mass = 47.2 (3) if incorrect credit following steps in reacting masses calculation 117 of NaCl gives 46 of Na (1) 120 of NaCl gives $\frac{46}{117} \times 120$ of Na (1) ecf possible accept alternative method using moles n(NaCl) = 2051 (1) n(Na) = 2051 (1) m = 2051 × 23 = 47173 m = 47.2 (1) percentage yield = 80.6 / 81 / 80.65 (1) ecf possible		4		4	4	
		(ii)		accept any of following for (1) • sodium chloride used was impure • not all the sodium chloride had reacted • side reactions taking place • loss of product	1			1		1
		(iii)		sodium would react with any water present		1		1		1

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		6.92 (3) award (2) for value given to any other number of sig figs (6 × 7.59) + (7 × 92.41) (1) 6.9241 (1) ecf possible following minor slip	1	2		3	3	
		(ii)		the nucleus of lithium-7 contains four neutrons and that of lithium-6 contains three neutrons		1		1		
				Question 8 total	**2**	**8**	**0**	**10**	**7**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	*(a)*			hydrogen is a highly reactive gas ☐ only 0.5 ppm of hydrogen is present ☐ hydrogen does not become liquid on cooling to −200 °C ✓ hydrogen has a higher boiling point than helium ☐			1	1		
	(b)			carbon dioxide has a boiling point above −200 °C ☐ carbon dioxide has a melting point above −200 °C ✓ carbon dioxide has a melting point below −200 °C ☐ carbon dioxide has a boiling point below −200 °C ☐			1	1		
	(c)			they have different boiling points (1) nitrogen has lowest boiling point and evaporates first / oxygen has highest boiling point and evaporates last (1) gases collected (at different places on column) in order of boiling points (1)	1	2		3		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(d)			7.53×10^7 (2) if incorrect award (1) for either of following 75 268 817 $\frac{700000}{0.0093}$			2	2	2	
				Question 6 total	**1**	**2**	**4**	**7**	**2**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	*(a)*	(i)		award (1) for any of following • all have 19 protons but 20, 21 and 22 neutrons • all have 19 protons but different numbers of neutrons • all have same number of protons but 20, 21 and 22 neutrons all have same number of protons but different numbers of neutrons - neutral answer ignore references to electrons		1		1		
		(ii)		39.1 (3) 39.13468 (2) award (1) for correct substitution (39 × 93.1) + (40 × 0.0122) + (41 × 6.88)	1	2		3	3	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		award (1) for any **two** similarities • both float • both move • both bubble on surface • both produce hydrogen / gas • both form hydroxides / alkaline solutions award (1) for any **two** differences • potassium melts into ball (but lithium doesn't) • potassium ignites / burns (but lithium doesn't) • potassium bubbles / moves more rapidly (than lithium) • potassium is more reactive (than lithium)	2			2		2
		(ii)		$2K + 2H_2O \rightarrow 2KOH + H_2$ reactants (1) products (1) balancing (1) - reactants and products must be correct for balancing mark to be awarded		3		3		
				Question 7 total	**3**	**6**	**0**	**9**	**3**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
10/2	(a)			**C** (1) award (1) for any of following $\frac{9}{15} = 0.6$ both **B** and **C** have R_f of 0.6 both **B** and **C** have a dot at 9 cm it is the highest dot (in **C**) (1)			3	3	1	3
	(b)			more soluble pigments move further up / more soluble pigments move faster (2) pigments have different solubilities (1) neutral answer – different R_f values	2			2		2
	(c)			**B** (1) award (1) for any of following one of its dot has not moved / is still on the line one of its dots has $R_f = 0$ pigment needs to be soluble to move up the paper			2	2		2
	(d)			62 (2) if incorrect award (1) for 36 or $\frac{12}{58}$		2		2	2	
				Question 10/2 total	**2**	**2**	**5**	**9**	**3**	**7**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)	I	evaporation / boiling condensation	2			2		2
			II	distillation neutral answer – desalination	1			1		1
		(ii)		• water (front) travels up paper / is absorbed (1) award (1) for any of following • more soluble dye travels further up paper • dyes travel (up paper) at different speeds • dyes travel different distances • dyes have different R_f values neutral answer – dyes have different solubilities		2		2		2
	(b)	(i)		14			1	1		
		(ii)		38°C (3) if answer is incorrect award (1) each for any of following solubility at 55°C = 94 g 94 – 36 = 58 g ecf possible			3	3	3	
				Question 3 total	**3**	**2**	**4**	**9**	**3**	**5**