

Multiple Choice Answers

Q12: B

Q13: D

Multiple Choice Answers

Q12: A

Q13: C

Q14: A

1(a)(i)	24 protons 28 neutrons 24 electrons
1(a)(ii)	(⁵⁴ Cr has two) more neutrons (than ⁵² Cr)
1(a)(iii)	(relative) abundance (of each isotope)
1(a)(iv)	The fourth isotope has any value of RIM less than 51.996
1(b)(i)	1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ (3d ⁵ 4s ¹)
1(b)(ii)	6
1(c)(i)	Cr / Cr ₂ O ₇ ²⁻ AND it gains electrons
1(c)(ii)	(+) ⁴
1(c)(iii)	<i>Due to an issue with question 1(c)(iii), the question has been removed from the question paper.</i>
1(c)(iv)	M1 CO ₂ has only instantaneous / temporary dipole–induced dipole forces AND methanal has permanent dipole–permanent dipole (and id-id) forces M2 IMF's in methanal are stronger than IMF's in CO ₂
1(d)(i)	rate of forward and backward (reaction) are the same / equal OR concentrations of reactants and products are constant
1(d)(ii)	closed system
1(d)(iii)	M1 (mixture becomes more) orange M2 forward reaction is endothermic M3 (mixture becomes more) orange M4 equilibrium moves (forwards/right) to compensate for extra acid / H ⁺
1(e)	M1 hydrolysis M2 CrF ₄ + 2H ₂ O → CrO ₂ + 4HF

3(a)		<i>observations</i>		
	<i>test</i>	FB 6	FB 7	FB 8
	Test 1 MnO ₂	No change	No change	Fizzing * Heat released * (Gas / oxygen) relights a glowing splint *
	Test 2 Mg	Fizzing * Heat released (only award if not awarded for FB 8 test 1) (Gas / hydrogen ignites with) a pop (sound) with a lit splint *	No change / no fizzing	No change
	Test 3 FeSO ₄	No change * (award one * if both no changes highlighted correctly recorded)	Green ppt * (ppt) turns brown (on standing) *	Either solution OR turns AND yellow / yellow-orange / orange-brown / yellow-brown / (light) brown * Fizzing * (Gas / oxygen) relights a glowing splint (only award if not awarded in FB 8 test 1 above)
2 * = 1 mark (round down)				
3(a)(ii)	FB 6 CH ₃ COOH / formula of any acid containing O FB 7 NaOH / formula of any Group 1 hydroxide FB 8 H ₂ O ₂			
3(b)(i)	Fizzing* Forms colourless solution* Attempts limewater test* Gas gives white ppt with limewater *			
3(b)(ii)	Cream / off-white ppt AND Partially soluble / insoluble in (aqueous) ammonia			
3(b)(iii)	M1 Test 1 No change / no ppt AND (on heating) gas / fizzing / ammonia turns litmus blue			
	M2 Test 2 Brown or yellow solution OR turns brown or yellow			
3(b)(iv)	cations: NH ₄ ⁺ and unknown anions: Br ⁻ and CO ₃ ²⁻			
3(b)(v)	Ag ⁺ (aq) + Br ⁻ (aq) → AgBr(s)			