Multiple Choice Answers

Q21: B

Multiple Choice Answers

Q22: A

Multiple Choice Answers

Q21: B

<table>
<tr><td>3(a)(i)</td><td>M1 Heat (solid FA 5)
AND
observe condensation, droplets, steam, water vapour

M2 Make an aqueous solution of FA 5 / dissolve in water to use for tests

M3 (To portion of the solution) add aqueous NH_3
AND
white ppt AND insoluble in excess NH_3

M4 (To portion of the solution) add aqueous barium chloride or barium nitrate
AND
white precipitate

M5 to distinguish sulfate / sulfite
(white precipitate from M4) insoluble in hydrochloric OR nitric acid
OR
$KMnO_4$ is not decolourised / remains purple (added after M4 or directly to FA 5 (aq))</td></tr>
<tr><td>3(a)(ii)</td><td><table><tr><td>Zn^{2+}</td><td>X</td></tr><tr><td>SO_4^{2-}</td><td>✓</td></tr><tr><td>H_2O</td><td>✓</td></tr></table></td></tr>
<tr><td>3(b)(i)</td><td>• (FA 6) starting colour purple
• solid jumps / moves around
• black residue
• test with glowing splint
• splint relights / glows more brightly</td></tr>
<tr><td>3(b)(ii)</td><td>(dark) Green</td></tr>
</table>

3(c)(i)

'No change' 2 correct = *, 3 correct = **

2* = 1 mark

Max mark = 4

test	*observations*		
	FA 7	**FA 8**	**FA 9**
Test 1 Add hydrogen peroxide	Bubbles/ effervescence * Purple / **FA 7** (solution) to colourless (solution) * (Gas / oxygen) relights glowing splint *	No change	Bubbles / effervescence * (Gas/ oxygen) relights glowing splint *
Test 2 Add sodium hydroxide, then		Off-white ppt*	No change
leave to stand		brown ppt on standing*	
Test 3 Add aqueous iron(II) sulfate	Turns colourless / yellow **OR** colourless / yellow solution formed*	No change	

3(c)(ii)

manganese / Mn

3(c)(iii)

	FA 6 / FA 7	**FA 8**
oxidation state	(+)7	(+)2

3(a)(i)

- selects (aqueous) silver nitrate and (aqueous) ammonia *
- white ppt *
- soluble in (aqueous) ammonia *
- NaC*l* *

2 * = 1 mark

3(a)(ii)

(The acid) removes / reacts with the hydrogencarbonate ions **OR** silver ions react with hydrogencarbonate ions

3(b)(i)

- green (at start) *
- turns to a black powder / solid *
- powder very fluid / moves around the test-tube *
- condensation (on walls of test-tube) *

2 * = 1 mark

3(b)(ii)

- forms green-blue solution *
- effervescence *
- vigorous reaction *
- attempts to test with limewater *
- gas / carbon dioxide gives white precipitate / solid with limewater *

2 * = 1 mark

3(b)(iii)

Test 1 Add NaOH(aq)	(pale) blue precipitate insoluble in excess *
Test 2 Add NH_3(aq)	(pale) blue precipitate * (precipitate dissolves forming) dark / deep blue solution in excess *
Test 3 Add aluminium foil	effervescence / fizzing* (gas) pops with a lighted splint * pink-brown solid * turns colourless / pale blue solution formed * gets hotter *

Metal ion in **FB 7**: Cu^{2+} *

2 * = 1 mark

3(c)(i)

Test 1 Add NaOH(aq)	green precipitate * insoluble in excess * (precipitate) turns brown (on surface) *
Test 2 Add acidified $KMnO_4$	purple to colourless / (pale) yellow solution **OR** $KMnO_4$ decolourised*

2 * = 1 mark

Metal ion in **FB 8**: Fe^{2+}

3(c)(ii)

Redox reaction
AND change to colourless linked to reduction of manganate(VII) ions **OR** change to yellow colour linked to oxidation of Fe^{2+} or production of Fe^{3+}.

3(a)

	observations		
test	**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_3COOH / formula of any acid containing O **FB 7** NaOH / formula of any Group 1 hydroxide **FB 8** H_2O_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)	$Ag^+(aq) + Br^-(aq) \rightarrow AgBr(s)$