

Multiple Choice Answers

Q33: C

Multiple Choice Answers

Q34: D

Q35: A

Q37: C

Multiple Choice Answers

Q36: C

4(a)(i)	free-radical substitution
4(a)(ii)	M1 $\text{C}_3\text{H}_8 + \text{Cl}\cdot \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\cdot + \text{HCl}$ OR $\text{C}_3\text{H}_8 + \text{Cl}\cdot \rightarrow \text{C}_3\text{H}_7\cdot + \text{HCl}$ M2 $\text{CH}_3\text{CH}_2\text{CH}_2\cdot + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{Cl}\cdot$ OR $\text{C}_3\text{H}_7\cdot + \text{Cl}_2 \rightarrow \text{C}_3\text{H}_7\text{Cl} + \text{Cl}\cdot$ etc M3 $\text{CH}_3\text{CH}_2\text{CH}_2\cdot + \text{Cl}\cdot \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ OR $\text{C}_3\text{H}_7\cdot + \text{Cl}\cdot \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
4(a)(iii)	homolytic
4(a)(iv)	1,2-dichloropropane
4(a)(v)	M1 (type of structural isomerism) positional M2 (type of stereoisomerism) optical
4(b)	sodium hydroxide AND water
4(c)(i)	orange to green
4(c)(ii)	$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + 2[\text{O}] \rightarrow \text{CH}_3\text{CH}_2\text{COOH} + \text{H}_2\text{O}$
4(d)(i)	condensation
4(d)(ii)	M1 absorption labelled at approx. 1750 cm^{-1} identified as C=O M2 absorption labelled at approx. 1650 cm^{-1} identified as C=C M3 absorption labelled at approx. 1170 cm^{-1} identified as C—O
4(d)(iii)	$(0.31 / 4.7 \times 100 / 1.1) = 6$ carbon atoms

3(a)(i)	2 * = 1 mark (round down). Max 5 marks.																						
	<table><tr><th rowspan="2">test</th><th colspan="2">observations</th></tr><tr><th>FA 4</th><th>FA 5</th></tr><tr><td>1 + NaOH(aq)</td><td>red-brown / brown ppt AND insoluble in excess *</td><td>white ppt * soluble in excess *</td></tr><tr><td>2 + NH₃(aq)</td><td>red-brown / brown ppt AND insoluble in excess *</td><td>white ppt AND insoluble in excess *</td></tr><tr><td>3 + Na₂CO₃(aq)</td><td>fizzing * gas gives white ppt with limewater * red-brown ppt *</td><td>white ppt * fizzing * gas gives white ppt with limewater (award if not awarded for FA 4)</td></tr><tr><td>4 + BaCl₂(aq) / Ba(NO₃)₂(aq)</td><td>white ppt AND</td><td>white ppt *</td></tr><tr><td>5 + H⁺ / KMnO₄(aq)</td><td>stays purple / no change AND</td><td>stays purple / no change *</td></tr></table>	test	observations		FA 4	FA 5	1 + NaOH(aq)	red-brown / brown ppt AND insoluble in excess *	white ppt * soluble in excess *	2 + NH ₃ (aq)	red-brown / brown ppt AND insoluble in excess *	white ppt AND insoluble in excess *	3 + Na ₂ CO ₃ (aq)	fizzing * gas gives white ppt with limewater * red-brown ppt *	white ppt * fizzing * gas gives white ppt with limewater (award if not awarded for FA 4)	4 + BaCl ₂ (aq) / Ba(NO ₃) ₂ (aq)	white ppt AND	white ppt *	5 + H ⁺ / KMnO ₄ (aq)	stays purple / no change AND	stays purple / no change *		
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3(a)(ii)	<table><tr><th>ions</th><th>FA 4</th><th>FA 5</th></tr><tr><td>cations</td><td>Fe³⁺; H⁺</td><td>Al³⁺</td></tr><tr><td>anions</td><td>SO₄²⁻</td><td>SO₄²⁻</td></tr></table> 5 ions correct = 3 marks 3 or 4 ions correct = 2 marks 2 ions correct = 1 mark			ions	FA 4	FA 5	cations	Fe ³⁺ ; H ⁺	Al ³⁺	anions	SO ₄ ²⁻	SO ₄ ²⁻											
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3(b)(ii)	M1 (FA 6 is) methanoic acid because it produces CO_2 / reacts with sodium carbonate AND it can be oxidised / it reacts with KMnO_4 M2 (FA 7 is) propan-2-ol as it gives a ppt in test 2 OR gives a positive tri-iodomethane/iodoform test OR has the $-\text{CH}(\text{OH})\text{CH}_3$ group
3(c)	Correct equation $\text{CH}_3\text{CH}_2\text{COOH} + \text{CH}_3\text{CH}_2\text{OH} \rightarrow \text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3 + \text{H}_2\text{O}$ OR $\text{C}_2\text{H}_5\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{C}_2\text{H}_5\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$