

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 $\text{C}_3\text{H}_8 + \text{Cl}^\bullet \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2^\bullet + \text{HCl}$ OR $\text{C}_3\text{H}_8 + \text{Cl}^\bullet \rightarrow \text{C}_3\text{H}_7^\bullet + \text{HCl}$ M2 $\text{CH}_3\text{CH}_2\text{CH}_2^\bullet + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{Cl}^\bullet$ OR $\text{C}_3\text{H}_7^\bullet + \text{Cl}_2 \rightarrow \text{C}_3\text{H}_7\text{Cl} + \text{Cl}^\bullet$ etc M3 $\text{CH}_3\text{CH}_2\text{CH}_2^\bullet + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ OR $\text{C}_3\text{H}_7^\bullet + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
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.

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 *

3(a)(ii)

ions	FA 4	FA 5
cations	Fe ³⁺ ; H ⁺	Al ³⁺
anions	SO ₄ ²⁻	SO ₄ ²⁻

5 ions correct = 3 marks
3 or 4 ions correct = 2 marks
2 ions correct = 1 mark

3(b)(i)

2 * = 1 mark (round down)

test	observations	
	FA 6	FA 7
1 + H ⁺ / KMnO ₄ (aq)	(turns paler pink)	(purple fades slightly)
and warm	decolourises / turns colourless / turns (pale) yellow *	decolourises / turns colourless / turns (pale) yellow *
2 + I ₂ (aq) + NaOH (and warm)	no change *	ppt * that is (pale) yellow *
3 + Na ₂ CO ₃ (aq)	fizzing *	no change *

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 $\text{C}_2\text{H}_5\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{C}_2\text{H}_5\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$