

Multiple Choice Answers

Q5: B

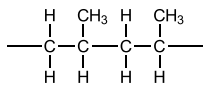
Multiple Choice Answers

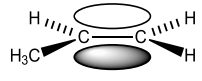
Q25: B

Q26: D

Multiple Choice Answers

Q28: A

4(a)(i)	reduction
4(a)(ii)	PCl ₅ / PCl ₃ / SOCl ₂ OR KCl / NaCl AND conc. H ₂ SO ₄ / conc. H ₃ PO ₄
4(a)(ii)	M1 C ₂ H ₅ CH ₂ Cl + NaOH → C ₃ H ₆ + H ₂ O + NaCl M2 ethanol (solvent) AND heat / reflux
4(a)(iv)	conc. H ₂ SO ₄ OR conc. H ₃ PO ₄ OR Al ₂ O ₃ AND heat
4(b)(i)	addition
4(b)(ii)	M1 (molecules that have the) same structural formula (and same molecular formula) M2 but different 3D / spatial arrangement of atoms / groups
4(b)(iii)	 M1 M2 optical isomerism M3 the methylated carbon has four different groups attached
4(b)(iv)	M1 non-biodegradability M2 harmful combustion products
4(c)(i)	2,3-dimethylbut-1-ene
4(c)(ii)	(The spectrum is of) X AND 41 is [CH ₂ =CCH ₃] ⁺ / 41 is C ₃ H ₅ ⁺ OR 43 is [CH ₃ CHCH ₃] ⁺ / 43 is C ₃ H ₇ ⁺ OR X would NOT have significant peak at 54 / [(CH ₃) ₂ C=C ⁺] / C ₄ H ₆ ⁺ OR X would NOT have significant peak at 42 due to [(CH ₃) ₂ C ⁺] / C ₃ H ₆ ⁺
4(c)(iii)	([M+1]⁺ / 34.7 × 100 / 1.1 = 6) [M+1]⁺ = 2.29

3(a)(i)	
3(a)(ii)	yellow precipitate
3(a)(iii)	elimination
3(a)(iv)	
3(b)(i)	$(\text{CH}_3)_2\text{CHOH} + \text{Na} \rightarrow (\text{CH}_3)_2\text{CHO}^{(-)}\text{Na}^{(+)} + \frac{1}{2}\text{H}_2$
3(b)(ii)	M1 correct dipole on $\delta^+\text{C}-\text{Br}\delta^-$ AND curly arrow from C—Br bond to Br M2 intermediate  M3 curly arrow from lone pair of (CH₃)₂CHO[−] to C⁺
3(b)(iii)	M1 rate would decrease M2 C—Br is weaker (than C—Cl, so breaks more easily)
3(b)(iv)	$\text{C}_6\text{H}_{14}\text{O} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 7\text{H}_2\text{O}$

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)	<i>ions</i>	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)		
	<i>test</i>	<i>observations</i>	
		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 –CH(OH)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 $\text{C}_2\text{H}_5\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{C}_2\text{H}_5\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$