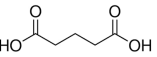
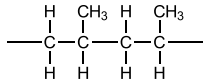


Multiple Choice Answers

Q40: D

3(a)	simplest /lowest (whole number / integer) ratio of atoms (of each element) in a compound / molecule
3(b)	two of: 
3(c)(i)	homolytic
3(c)(ii)	M1 $\text{C}_5\text{H}_{10} + \text{Cl}\cdot \rightarrow \text{C}_5\text{H}_9\cdot + \text{HCl}$ M2 $\text{C}_5\text{H}_9\cdot + \text{Cl}_2 \rightarrow \text{C}_5\text{H}_9\text{Cl} + \text{Cl}\cdot$
3(c)(iii)	termination
3(d)(i)	HCl (g)
3(d)(ii)	M1 (reaction 1): $-3115 - 286 + 3292 = -109$ (kJ mol ⁻¹) M2 $\Delta\text{H}_2 = -53 - (-109) = (+)56$ (kJ mol ⁻¹)
3(e)(i)	
3(e)(ii)	M1 absorption labelled at approx. 3000 cm ⁻¹ identified as O—H M2 absorption labelled at approx. 1720 cm ⁻¹ identified as C=O
4(a)(i)	reduction
4(a)(ii)	PCl_5 / PCl_5 / SOCl_2 OR KCl / NaCl AND conc. H_2SO_4 / conc. H_3PO_4
4(a)(ii)	M1 $\text{C}_2\text{H}_5\text{CH}_2\text{Cl} + \text{NaOH} \rightarrow \text{C}_2\text{H}_6 + \text{H}_2\text{O} + \text{NaCl}$ M2 ethanol (solvent) AND heat / reflux
4(a)(iv)	conc. H_2SO_4 OR conc. H_3PO_4 OR Al_2O_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 $[\text{CH}_2=\text{CCH}_3]^+$ / 41 is C_3H_5^+ OR 43 is $[\text{CH}_3\text{CHCH}_3]^+$ / 43 is C_3H_7^+ OR X would NOT have significant peak at 54 / $[(\text{CH}_3)_2\text{C}=\text{C}^+]$ / C_4H_6^+ OR X would NOT have significant peak at 42 due to $[(\text{CH}_3)_2\text{C}^+]$ / C_3H_6^+
4(c)(iii)	$([\text{M}+1]^+ / 34.7 \times 100 / 1.1 = 6)$ $[\text{M}+1]^+ = 2.29$