

Multiple Choice Answers

Q32: C

Q35: B

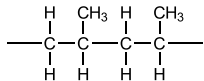
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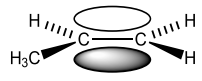
Q33: A

Q39: B

Multiple Choice Answers

Q33: A

4(a)(i)	reduction
4(a)(ii)	PCl_5 / PCl_3 / SOCl_2 OR KCl / NaCl AND conc. H_2SO_4 / conc. H_3PO_4
4(a)(ii)	M1 $\text{C}_2\text{H}_5\text{CH}_2\text{Cl} + \text{NaOH} \rightarrow \text{C}_3\text{H}_6 + \text{H}_2\text{O} + \text{NaCl}$ 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)	$([M+1]^+ / 34.7 \times 100 / 1.1 = 6)$ $[M+1]^+ = 2.29$

2(a)	M1 Al_2O_3 is ionic M2 P_4O_{10} is a (simple) molecule M3 ionic bonds are stronger than intermolecular forces
2(b)(i)	$\text{mol}^{-2} \text{dm}^6$
2(b)(ii)	M1 at equilibrium: moles of $\text{CO} = 0.120$ AND moles of $\text{H}_2 = 0.240$ M2 $[\text{CH}_3\text{OH}] = 0.056$ AND $[\text{CO}] = 0.024$ AND $[\text{H}_2] = 0.048$ M3 use of K_c with correct evaluation = 1.01×10^3
2(b)(iii)	no effect AND K_c is not affected by pressure
2(c)(i)	increases rate by providing a different mechanism with a lower activation energy
2(c)(ii)	$2\text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{OCH}_3 + \text{H}_2\text{O}$
2(c)(iii)	$\text{P}_4\text{O}_{10} + 6\text{H}_2\text{O} \rightarrow 4\text{H}_3\text{PO}_4$
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 $\text{C}-\text{Br}$ bond to Br  M2 intermediate M3 curly arrow from lone pair of $(\text{CH}_3)_2\text{CHO}^-$ to C^+
3(b)(iii)	M1 rate would decrease M2 $\text{C}-\text{Br}$ is weaker (than $\text{C}-\text{Cl}$, so breaks more easily)
3(b)(iv)	$\text{C}_8\text{H}_{14}\text{O} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 7\text{H}_2\text{O}$