Multiple Choice Answers

Q32: C

Q35: B

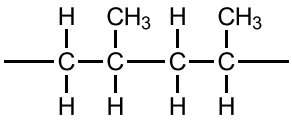
Multiple Choice Answers

Q33: A

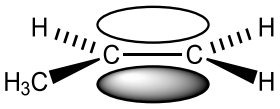
Q39: B

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** $C_2H_5CH_2Cl + NaOH \rightarrow C_3H_6 + H_2O + NaCl$ **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 $[CH_2=CCH_3]^+$ / 41 is $C_3H_5^+$ **OR** 43 is $[CH_3CHCH_3]^+$ / 43 is $C_3H_7^+$ **OR X** would NOT have significant peak at 54 / $[(CH_3)_2C=C^+]$ / $C_4H_6^+$ **OR X** would NOT have significant peak at 42 due to $[(CH_3)_2C^+]$ / $C_3H_6^+$
4(c)(iii)	($[M+1]^+$ / 34.7 × 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)	$mol^{-2}\ dm^6$
2(b)(ii)	**M1** at equilibrium: moles of CO = 0.120 **AND** moles of H_2 = 0.240 **M2** $[CH_3OH]$ = 0.056 **AND** [CO] = 0.024 **AND** $[H_2]$ = 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)	$2CH_3OH \rightarrow CH_3OCH_3 + H_2O$
2(c)(iii)	$P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$

3(a)(i)	
3(a)(ii)	yellow precipitate
3(a)(iii)	elimination
3(a)(iv)	
3(b)(i)	$(CH_3)_2CHOH + Na \rightarrow (CH_3)_2CHO^{(-)}Na^{(+)} + \frac{1}{2}H_2$
3(b)(ii)	**M1** correct dipole on $^{\delta+}C—Br^{\delta-}$ **AND** curly arrow from C—Br bond to Br **M2** intermediate  **M3** curly arrow from lone pair of $(CH_3)_2CHO^-$ to C^+
3(b)(iii)	**M1** rate would decrease **M2** C—Br is weaker (than C—Cl, so breaks more easily)
3(b)(iv)	$C_6H_{14}O + 9O_2 \rightarrow 6CO_2 + 7H_2O$