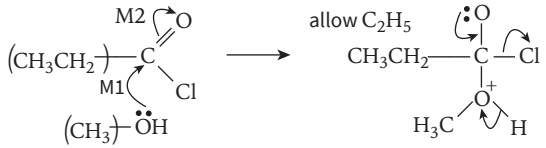
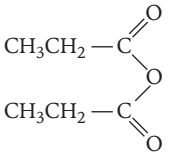
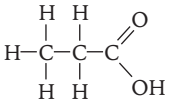
A Level AQA Chemistry

Chapter 23 – answers

Question	Answers	Extra information	Mark	AO Spec reference
01.1	$CH_3OH + CH_3CH_2COOH \rightarrow CH_3CH_2COOCH_3 + H_2O$	1 mark for each correct side of the equation	1 1	3.3.9.1
01.2			3	3.3.9.2
01.3	Acylation / addition-elimination		1	3.3.9.2
01.4	 or $(CH_3CH_2CO)_2O$		1	3.3.4.3, 3.3.9.2
01.5	Anhydride less easily hydrolysed/reaction less violent/no corrosive/no toxic HCl fumes given off/anhydride cheaper	One of the given points for the mark	1	3.3.9.2
02.1			1	3.3.5.2, MS4.2, MS4.3
02.2	$K_2Cr_2O_7$ / H^+ OR acidified potassium dichromate		1	3.3.5.2
02.3	Propanoic acid		1	3.3.4.3
02.4	$NaBH_4$		1	3.3.8
02.5	Reduction		1	3.3.8

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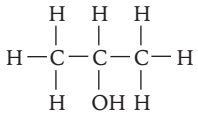
02.6			1	
02.7	H_2SO_4 OR HCl	Only one acid needed	1	3.3.9.1
02.8	Dilute acid AND heat		1	3.3.9.1
03.1	$CH_3CH_2Cl + 2\ NH_3 \rightarrow CH_3CH_2NH_2 + NH_4Cl$	One mark for each correct side of the reaction	1 1	3.3.11.1
03.2	CH_3CN AND H_2/Ni	One mark for each	1 1	3.3.11.1
03.3	The reduction from a nitrile / part b) is likely to give a greater yield as it has only one product/has a higher atom economy		1 1	PS 1.2
04.1	HCN OR KCN/HCl/		1	3.3.8
04.2	Nucleophilic addition		1	3.3.8
04.3	M_r butanone = 72 M_r hydroxynitrile = 99 5 g butanone = 5 / 72 = 0.0694 moles Moles butanone = moles of hydroxynitrile Mass hydroxynitrile = 0.0694 × 99 = 6.87 g theoretical yield 64% = actual yield / 6.87 g actual yield = 0.64 × 6.87 = 4.40 g		1 1 1 1	3.1.2.5, MS0.2
04.4	$NaBH_4$		1	3.3.8
04.5	Racemic mixture formed / 50 : 50 / equal amounts of enantiomers		1	3.3.7

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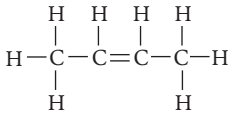
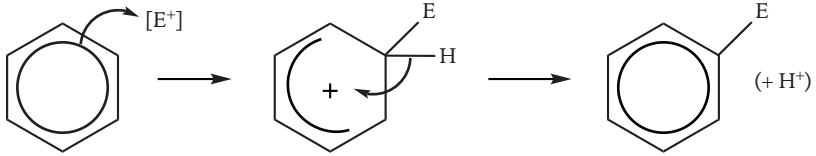
04.6			1	3.3.1.1
04.7	It involves the loss/removal of water		1	3.3.5.3
05.1			3	3.3.10.2
05.2	Nucleophilic addition		1	3.3.8
05.3	$NaBH_4$		1	3.3.8
05.4	Q contains asymmetrical carbon/chiral carbon		1	3.3.7
05.5	H_3PO_4 OR H_2SO_4		1	3.3.5.3
05.6	*E/Z* isomerism/Geometrical Isomerism		1	3.3.1.3
05.7	Double bond/C═C bond and 2 different groups attached to each of the carbons in that double bond		1	3.3.1.3
06.1	2-methylpropene The absorption at 1650 cm^{-1} indicates an alkene present	Can also show this using a diagram	1 1	3.3.6.3
06.2	HBr		1	3.3.4.2

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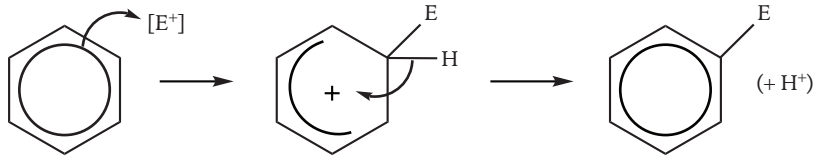
06.3			3	3.3.4.2
06.4	P gives 3 peaks (in its NMR spectrum) R gives 1 peak (in its NMR spectrum)		1 1	3.3.15

Skills box answers:

1. As $[H^+]$ ↑, pH ↓
2. As $p(H_2)$ ↑, K_p ↓
3. As $p(H_2)$ ↑, K_p ↓
4. As $[H^+]$ ↑, rate ↑
5. As $[H^+]$ ↑ (from 0 to 0.5), K_a ↑