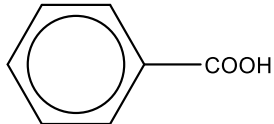
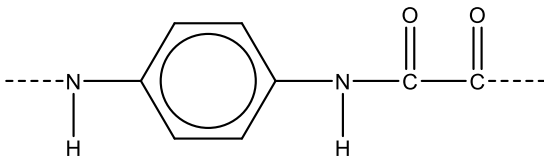
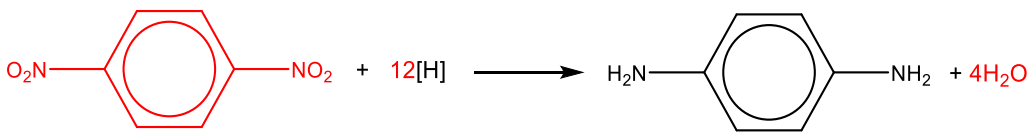
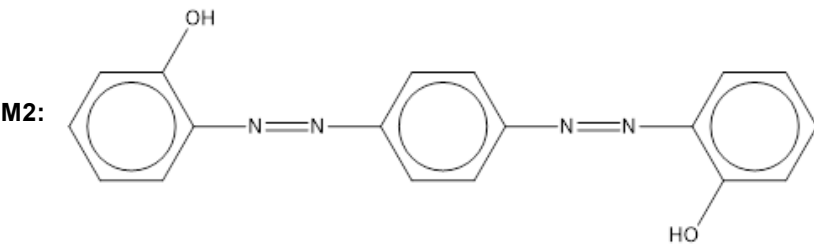
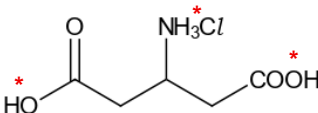
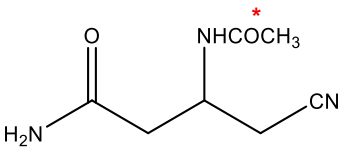
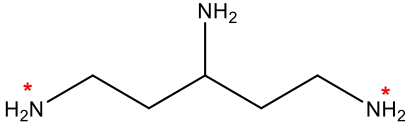


7(a)	M1: ClCH_2COOH BrCH_2COOH CH_3COOH $\text{CH}_3\text{CH}_2\text{OH}$ most acidic least acidic M2: electron withdrawing groups / electronegative groups / negative inductive effect AND weakens O–H bond / more stable anion OR electron donating groups / positive inductive effect AND strengthens O–H bond / less stable anion M3 M4: - chlorine is more electron-withdrawing / electronegative than bromine (related to XCH_2COOH) - electron withdrawing of $\text{C}=\text{O}$ / negative inductive effect of $\text{C}=\text{O}$ (related to COOH) - positive inductive effect / electron donating of alkyl / ethyl / R group (related to ROH) any two [1], all three [2]
7(b)	M1:  M2: CO_2
7(c)(i)	 M1: correct displayed amide bond with $\text{C}=\text{O}$, $(\text{C}_6\text{H}_5)\text{-N}$ and $(\text{C-})\text{C}=\text{O}$ M2: rest of the structure correct with continuation bonds
7(c)(ii)	
7(d)(i)	M1: $\text{Cl}^- \text{N} \equiv \text{N}^+ - \text{C}_6\text{H}_4 - \text{N}^+ \equiv \text{N} \text{Cl}^-$  M2:
7(d)(ii)	HNO_2 (and HCl) AND $\leq 10^\circ \text{C}$ OR NaNO_2 AND HCl AND $\leq 10^\circ \text{C}$

6(a)	sp = 1 AND sp ² = 1 AND sp ³ = 3												
6(b)(i)	acid-base / neutralisation AND hydrolysis												
6(b)(ii)	reaction 7  reaction 8  reaction 9  any two * [1], any three * [2], any five * [3], all six * [4]												
6(c)(i)	five / 5												
6(c)(ii)	<table border="1"><tr><td>proton environment</td><td>a</td><td>b</td><td>c</td></tr><tr><td>name of splitting pattern</td><td>doublet</td><td>multiplet</td><td>doublet</td></tr><tr><td>chemical shift range, δ / ppm</td><td>2.2–3.0</td><td>3.2–4.0</td><td>2.0–3.0</td></tr></table> any three [1], all six [2]	proton environment	a	b	c	name of splitting pattern	doublet	multiplet	doublet	chemical shift range, δ / ppm	2.2–3.0	3.2–4.0	2.0–3.0
proton environment	a	b	c										
name of splitting pattern	doublet	multiplet	doublet										
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