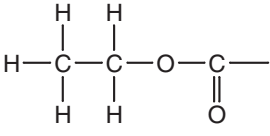
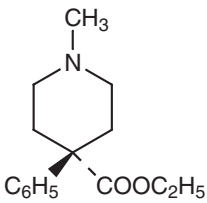
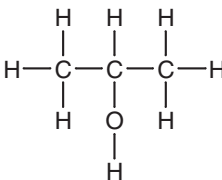


Answers to What's in a Medicine? End of Unit Test

Q	Answer with marks	Marking suggestions
1(a)	Methyl (1); ethanoate (1)	Allow methylethanoate
1(b)	Flask connected without leaks to... (1); reflux condenser (no stopper), water connections shown but not necessarily correctly labelled (1); labels: heat source, reagents (minimum: line across flask), correct water connections (in at bottom, out at top) (1)	
1(c)	Two from (2); the reagents would evaporate; and catch fire; enables them to react together without loss over a period of time	
1(d) (i)	Carboxylic acid (1)	
1(d) (ii)	Ethanoic acid (1)	
1(d) (iii)	Methanol (1)	
1(e)	Reflux/heat (1); with concentrated (1); sulphuric acid (1)	First mark depends on acid/alkali being mentioned. Second mark depends on third
1(f) (i)	ethanol (1) $ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} $ (1)	
1(f) (ii)	Primary (1); OH joined to C joined to 2 H atoms (1)	

Q	Answer with marks	Marking suggestions
2 (a)	Description or diagram(s) showing: t.l.c. plate in covered vessel (1) solvent level below... (1) spot labelled/described as 'cannabis resin solution' (1) use of 'locating agent' (or specific suggestion) (1) more than one spot, labelled/described as showing presence of more than one compound (1)	
2(b) (i)	Phenol/ether (1)	
2(b) (ii)	A will be more acidic (1); since it contains a -COOH/carboxylic acid group (1); which is more acidic than a phenol/-OH group (1)	
2(b) (iii)	It would fizz (1); acids react with carbonates to form carbon dioxide (1)	
2(b) (iv)	Purple/violet/mauve colour (1)	
2(b) (v)	No (1); neither phenol nor carboxylic acid groups react with it (1)	
2(c) (i)	Mass spectrometry (1)	
2(c) (ii)	Infrared spectroscopy (1)	

Q	Answer with marks	Marking suggestions
3(a) (i)	$247 - 174 (1) = 73 (1)$	Allow error carried forward on second mark
3(a) (ii)	Calculation for $\text{C}_3\text{H}_5\text{O}_2 = 73$ must be shown (1)	
3(a) (iii)	Ions are CH_3^+ and C_6H_5^+ CH_3 (1); C_6H_5 (1); both positive ions (1)	
3(b) (i)	Absorption/peak at $3400 \text{ (cm}^{-1}\text{)}$ (1) indicates O-H group (1)	Allow ± 50 Insist on O-H not OH

3(b) (ii)	 <p>(1);</p> <p>Some indication of why this was chosen, eg 'this (ester) hydrolyses to give ethanol' (1);</p>  <p>(1)</p>	
3(c)	Two from (2): the new compound might be a better painkiller; might have different medicinal properties, fewer side-effects	
3(d)	Flow chart showing <i>three from</i> (3): biological testing; testing on human volunteers; testing on small sample of patients; large trials on patients; placebos; looking especially for side reactions or effects on vulnerable groups	Procedures must be in a sensible order; maximum (2) if not
3(e) (i)	 <p>(1);</p> <p>Propan-2-ol (1)</p>	
3(e) (ii)	CH ₃ COCH ₃ CO group (1); rest of structure (1)	Or fuller structural formulae
3(e) (iii)	Ketone (1)	Allow carbonyl
3(e) (iv)	Reflux (1); with acid (1); dichromate(VI) (1)	First mark depends on mention of some oxidant (even if slightly incorrect). Allow named compounds and <i>correct</i> formulae
3(e) (v)	CH ₃ CH=CH ₂ (1); propene (1)	Or fuller structural formulae
3(e) (vi)	Elimination (1)	