

# 16. Hydroxy compounds

## 16.1 Alcohols

### Paper 2

#### Marking Scheme

## Q1.


(c)(i)	hydroxyl	1
(c)(ii)	$(1)\text{C}_4\text{H}_{10}\text{O} + (1)\text{Na} \rightarrow \text{C}_4\text{H}_9\text{ONa} + \frac{1}{2}\text{H}_2$	1

(c)(iii)	 <p>OR</p>	1
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## Q2.

(b)	$\text{H}_2\text{SO}_4(\text{aq})$ or $\text{HCl}(\text{aq})$	1
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## Q3.

(b)(iii)		2
(b)(iv)	alkyl groups are electron donating / have positive inductive effect.	1
	strengthens the O—H bond / makes $\text{H}^+$ less likely to be donated	1

## Q4.

(b)(i)	cold dilute acidified $\text{KMnO}_4$	1
(b)(ii)	$\text{CH}_2\text{O}$	1

(c)	 <p><b>M1</b> molecule with 5C atoms and 1 alcohol group <b>M2</b> molecule with <math>-\text{CH}(\text{CH}_3)\text{OH}</math></p>	2
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## Q5.

(b)	acid (conditions) / $\text{H}^+(\text{aq})$ <b>AND</b> heat under reflux	1
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## Q6.

(e)(i)	1 4 0	1
(e)(ii)	Solution turns from purple to colourless	1
	Orange / red precipitate forms	1
	no reaction	1

## Q7.

(c)(i)	substitution	1
(c)(ii)	$  \begin{array}{ccccccc}  & Cl & H & H & & & \\  &   &   &   & & & \\  H_3C & -C & -C & -C & -Cl \\  &   &   &   & & & \\  & H & H & H & & &   \end{array}  $	1

## Q8.

(a)(i)		1
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## Q9.

(c)	dehydrating agent / cause dehydration	1
(d)(i)	oxidation	1

## Q10.

(b)(ii)	substitution	1
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## Q11.

(a)(i)	potassium/sodium dichromate [(VI)] / $K_2Cr_2O_7$ / $Na_2Cr_2O_7$ acidified <b>AND</b> (heat) under reflux	2
(a)(ii)	$C_2H_5OH + 2[O] \rightarrow CH_3CO_2H + H_2O$	1

## Q12.

(c)(i)	<b>M1:</b> potassium dichromate(VI) <b>M2:</b> acid(ified) AND (heat under) <b>reflux</b>	<b>2</b>
(c)(ii)	<b>(M1: correct identity of R and statement re: reaction 3 ONLY ketone reduced)</b> R (is 2-hydroxybutanoic acid) <b>AND</b> as (only) C=O / ketone reduced	<b>2</b>
	<b>(M2: correct explanation re: strength of reducing agents)</b> NaBH <sub>4</sub> cannot reduce the COOH / <b>carboxylic acid</b> <b>OR</b> LiAlH <sub>4</sub> can reduce the COOH / <b>carboxylic acid</b>	

## Q13.

(b)(i)	HI(g) / PI <sub>3</sub> / P and I <sub>2</sub>	<b>1</b>
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## Q14.

(c)(i)	LiAlH <sub>4</sub> OR lithium tetrahydridoaluminate(III)	<b>1</b>
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## Q15.

(c)(ii)	X and Z – no reaction / no (visible) change	<b>1</b>
	Y – effervesces	<b>1</b>