



# IR PROBLEMS 1

The IR spectra of six compounds are shown. Complete the table to match the spectra to the compounds. Identify any key signals you used to identify each compound. You may not be able to decide between two of the compounds.

	butanoic acid	butanone	but-3-en-1-ol
Structure	$\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$	$\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$	$\text{CH}_2=\text{CH}-\text{CH}_2-\overset{\text{OH}}{\text{CH}_2}$
Spectrum	<b>T</b>	<b>R</b>	<b>S</b>
Bond(s)	<b>O-H (acid)</b>	<b>C=O</b>	<b>C=C O-H (alcohol)</b>
Wavenumber range ( $\text{cm}^{-1}$ )	<b>2500–3000</b>	<b>1680–1750</b>	<b>1620–1680 3230–3550</b>

	2-methylpropan-2-ol	2-ethylbutan-1-ol	pent-1-ene
Structure	$\begin{array}{c} \text{OH} \\   \\ \text{CH}_3-\text{C}-\text{CH}_3 \\   \\ \text{CH}_3 \end{array}$	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_2 \\   \quad   \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}_2 \\ \quad   \\ \quad \text{OH} \end{array}$	$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}=\text{CH}_2$
Spectrum	<b>Q / U</b>	<b>Q / U</b>	<b>P</b>
Bond(s)	<b>O-H (alcohol)</b>	<b>O-H (alcohol)</b>	<b>C=C</b>
Wavenumber range ( $\text{cm}^{-1}$ )	<b>3230–3550</b>	<b>3230–3550</b>	<b>1620–1680</b>

