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A-level  
**CHEMISTRY**

7405


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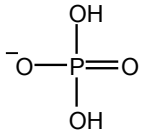
Data Booklet

This Data Booklet is provided with AQA A-level Chemistry question papers.

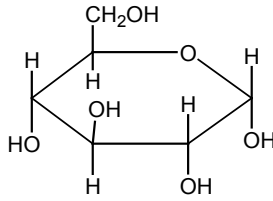


## Data Sheet

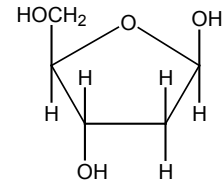
Infrared absorption data		<sup>1</sup> H NMR chemical shift data		<sup>13</sup> C NMR chemical shift data	
Bond	Wavenumber /cm <sup>-1</sup>	Type of proton	δ/ppm	Type of carbon	δ/ppm
N-H (amines)	3300 – 3500	ROH	0.5–5.0	$\begin{array}{c}   \\ -C- \\   \end{array}$	5–40
O-H (alcohols)	3230 – 3550	RCH <sub>3</sub>	0.7–1.2	$\begin{array}{c}   \\ R-C-Cl \text{ or } Br \\   \end{array}$	10–70
C-H	2850 – 3300	RNH <sub>2</sub>	1.0–4.5	$\begin{array}{c}   \\ R-C-C- \\    \quad   \\ O \end{array}$	20–50
O-H (acids)	2500 – 3000	R <sub>2</sub> CH <sub>2</sub>	1.2–1.4	$\begin{array}{c}   \\ R-C-N \\   \end{array}$	25–60
C≡N	2220 – 2260	R <sub>3</sub> CH	1.4–1.6	$\begin{array}{c}   \\ -C-O- \\   \end{array}$	50–90
C=O	1680 – 1750	$\begin{array}{c}   \\ R-C-C- \\    \quad   \\ O \end{array}$	2.1–2.6	$\begin{array}{c} \diagup \\ C=C \\ \diagdown \end{array}$	90–150
C=C	1620 – 1680	R-O-C-H	3.1–3.9	R-C≡N	110–125
C-O	1000 – 1300	RCH <sub>2</sub> Cl or Br	3.1–4.2		110–160
C-C	750 – 1100	$\begin{array}{c}   \\ R-C-O-C- \\    \quad   \\ O \end{array}$	3.7–4.1	$\begin{array}{c}   \\ R-C- \\    \\ O \end{array}$	160–185
		$\begin{array}{c} H \\   \\ R-C=C \\   \end{array}$	4.5–6.0	$\begin{array}{c}   \\ R-C- \\    \\ O \end{array}$	190–220
		$\begin{array}{c} O \\    \\ R-C-H \\   \\ O-H \end{array}$	9.0–10.0		
		$\begin{array}{c} O \\    \\ R-C-O-H \end{array}$	10.0–12.0		

**Phosphate and sugars**

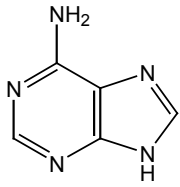
phosphate



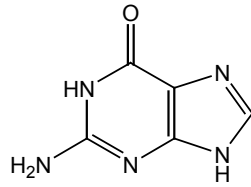
glucose



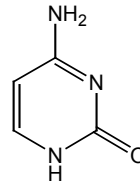
2-deoxyribose

**Bases**

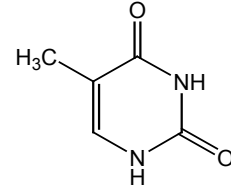
adenine



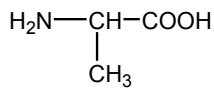
guanine



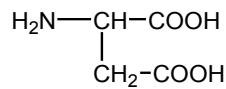
cytosine



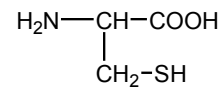
thymine

**Amino acids**

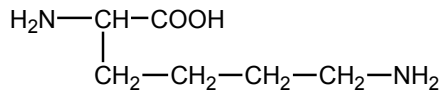
alanine



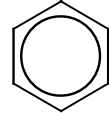
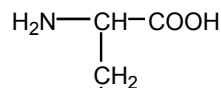
aspartic acid



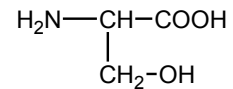
cysteine



lysine



phenylalanine



serine

**Haem B**