




A-level
CHEMISTRY

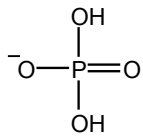
7405

Data Booklet

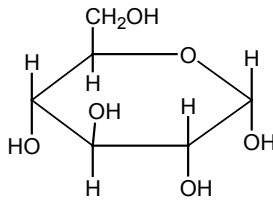
This Data Booklet is provided with AQA A-level Chemistry question papers.

Data Sheet

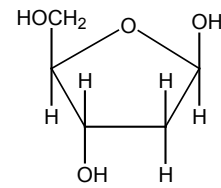
Infrared absorption data		¹ H NMR chemical shift data		¹³ C NMR chemical shift data	
Bond	Wavenumber /cm ⁻¹	Type of proton	δ/ppm	Type of carbon	δ/ppm
N-H (amines)	3300 – 3500	ROH	0.5–5.0	$\begin{array}{c} \\ -C- \\ \end{array}$	5–40
O-H (alcohols)	3230 – 3550	RCH ₃	0.7–1.2	$\begin{array}{c} \\ R-C-Cl \text{ or } Br \\ \end{array}$	10–70
C-H	2850 – 3300	RNH ₂	1.0–4.5	$\begin{array}{c} \\ R-C-C- \\ \quad \\ O \end{array}$	20–50
O-H (acids)	2500 – 3000	R ₂ CH ₂	1.2–1.4	$\begin{array}{c} \\ R-C-N \\ \end{array}$	25–60
C≡N	2220 – 2260	R ₃ CH	1.4–1.6	$\begin{array}{c} \\ -C-O- \\ \end{array}$	50–90
C=O	1680 – 1750	$\begin{array}{c} \\ R-C-C- \\ \quad \\ O \quad H \end{array}$	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 ₂ Cl or Br	3.1–4.2		110–160
C-C	750 – 1100	$\begin{array}{c} \\ R-C-O-C- \\ \quad \\ O \quad H \end{array}$	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

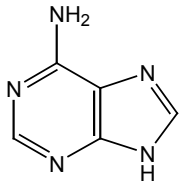
phosphate



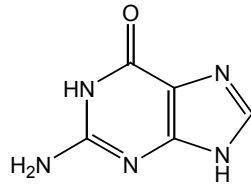
glucose



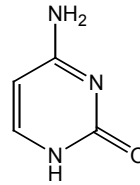
2-deoxyribose

Bases

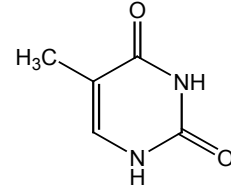
adenine



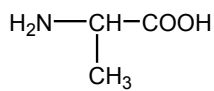
guanine



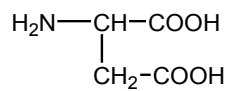
cytosine



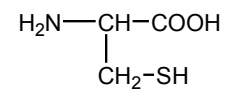
thymine

Amino acids

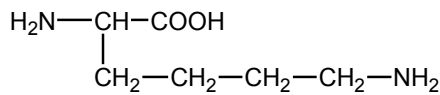
alanine



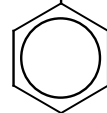
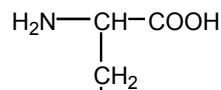
aspartic acid



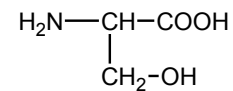
cysteine



lysine



phenylalanine



serine

Haem B