



A-level
CHEMISTRY

7405

Data Booklet

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

The Periodic Table of the Elements

	1	2	3	4	5	6	7	0	
(1)	6.9 Li lithium 3	9.0 Be beryllium 4	23.0 Na sodium 11	39.1 K potassium 19	85.5 Rb rubidium 37	132.9 Cs caesium 55	[223] Fr francium 87	173.1 Yb ytterbium 70	175.0 Lu lutetium 71
(2)									
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									
(11)									
(12)									
(13)									
(14)									
(15)									
(16)									
(17)									
(18)									

Key	
relative atomic mass	
symbol	
name	
atomic (proton) number	

1.0 H hydrogen 1	4.0 He helium 2
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Elements with atomic numbers 112-116 have been reported but not fully authenticated													
140.1 Ce cerium 58	140.9 Pr praseodymium 59	144.2 Nd neodymium 60	[145] Pm promethium 61	150.4 Sm samarium 62	152.0 Eu europium 63	157.3 Gd gadolinium 64	158.9 Tb terbium 65	162.5 Dy dysprosium 66	164.9 Ho holmium 67	167.3 Er erbium 68	168.9 Tm thulium 69	173.1 Yb ytterbium 70	175.0 Lu lutetium 71
232.0 Th thorium 90	231.0 Pa protactinium 91	238.0 U uranium 92	[237] Np neptunium 93	[244] Pu plutonium 94	[243] Am americium 95	[247] Cm curium 96	[247] Bk berkelium 97	[251] Cf californium 98	[252] Es einsteinium 99	[257] Fm fermium 100	[258] Md mendelevium 101	[259] No nobelium 102	[262] Lr lawrencium 103

* 58 – 71 Lanthanides

† 90 – 103 Actinides

Data Sheet

Table A

Infrared absorption data

Bond	Wavenumber /cm ⁻¹
N-H (amines)	3300 – 3500
O-H (alcohols)	3230 – 3550
C-H	2850 – 3300
O-H (acids)	2500 – 3000
C≡N	2220 – 2260
C=O	1680 – 1750
C=C	1620 – 1680
C-O	1000 – 1300
C-C	750 – 1100

Table B

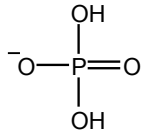
¹H NMR chemical shift data

Type of proton	δ/ppm
ROH	0.5–5.0
RCH ₃	0.7–1.2
RNH ₂	1.0–4.5
R ₂ CH ₂	1.2–1.4
R ₃ CH	1.4–1.6
	2.1–2.6
	3.1–3.9
RCH ₂ Cl or Br	3.1–4.2
	3.7–4.1
	4.5–6.0
	9.0–10.0
	10.0–12.0

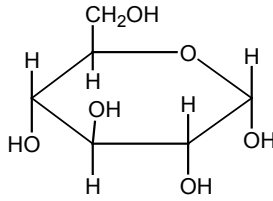
Table C

¹³C NMR chemical shift data

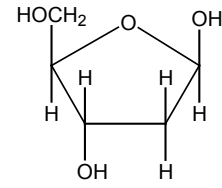
Type of carbon	δ/ppm
	5–40
	10–70
	20–50
	25–60
	50–90
	90–150
	110–125
	110–160
	160–185
	190–220

Phosphate and sugars

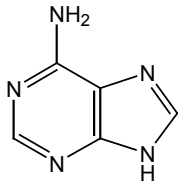
phosphate



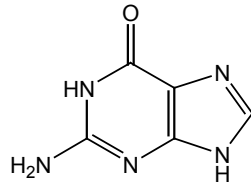
glucose



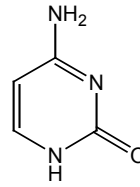
2-deoxyribose

Bases

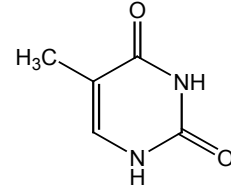
adenine



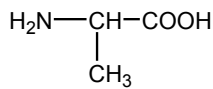
guanine



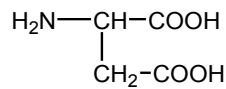
cytosine



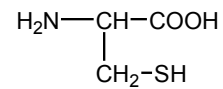
thymine

Amino acids

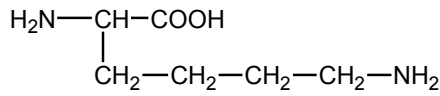
alanine



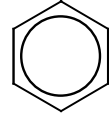
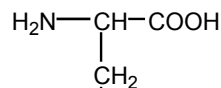
aspartic acid



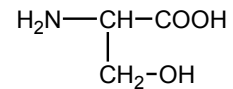
cysteine



lysine



phenylalanine



serine

Haem B