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New Zealand Qualifications Authority

Scholarship 2025 Chemistry

RESOURCE BOOKLET

Refer to this booklet to answer the questions for Scholarship Chemistry.

Check that this booklet has pages 2–3 in the correct order and that none of these pages is blank.

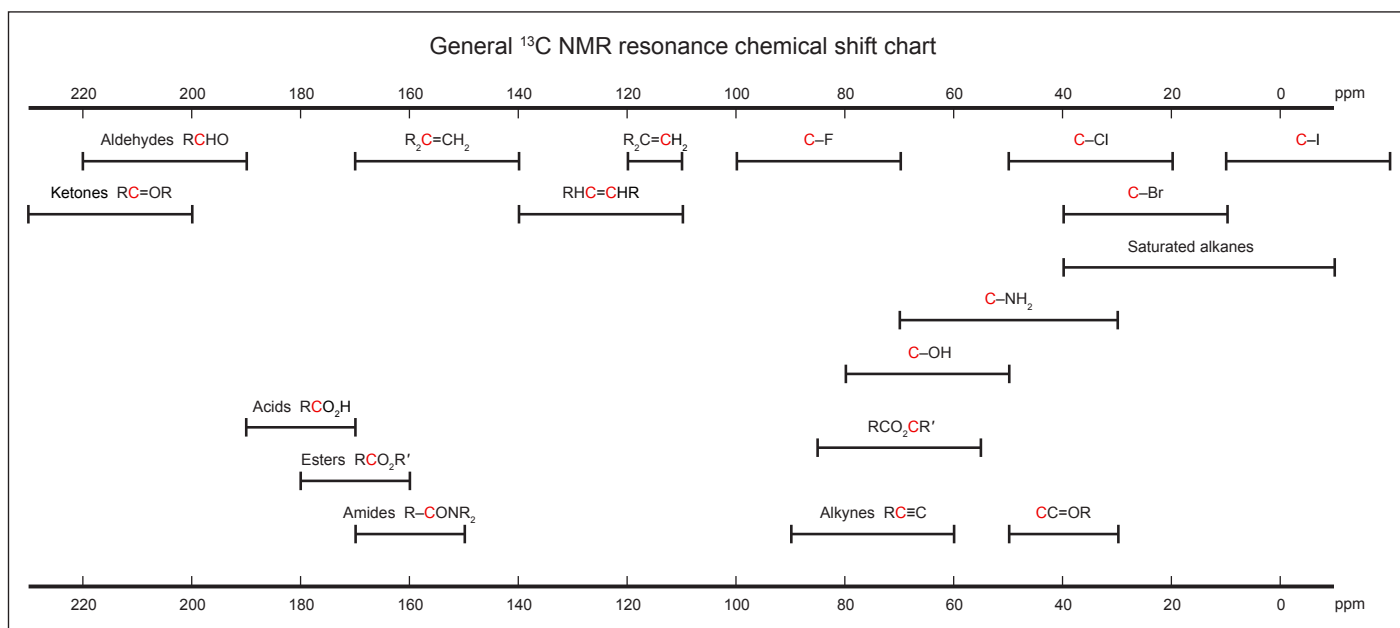
YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

SPECTROSCOPY DATA SHEET

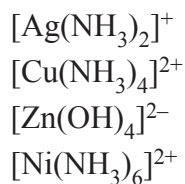
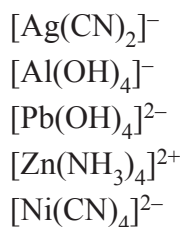
INFRARED SPECTROSCOPY

Functional group	Vibration	Wavenumber/ cm ⁻¹	Functional group	Vibration	Wavenumber/ cm ⁻¹
Alkane	C–H stretch	2950–2800 (s)	Aldehyde	C=O stretch	1725 (s)
Alkene	C=C–H stretch	3100–3010 (s)	Ketone	C=O stretch	1715 (s)
	C=C stretch	1690–1630 (m)	Carboxylic acid	O–H stretch	3000–2500 (s)
Alkyl halide	C–F stretch	1400–1000 (s)		C=O stretch	1730–1700 (s)
	C–Cl stretch	785–540 (m-w)		C–O stretch	1320–1210 (s)
	C–Br stretch	650–510 (s-m)	Acid chloride	C=O stretch	1810–1775 (s)
	C–I stretch	600–485 (s-m)		C–Cl stretch	730–550 (s-m)
Alcohol	O–H stretch	3600–3300 (s)	Ester	C=O stretch	1750–1735 (s)
	C–O stretch	1260–1000 (s)		C–O stretch	1260–1160 (s)
Amine	N–H stretch (1 per bond)	3500–3300 (s-w)	Amide	N–H stretch	3500–3200 (s)
	N–H bend	1640–1500 (s)		C=O stretch	1680–1630 (s)
	C–N stretch	1200–1025 (s)			

¹³C NMR RESONANCE SHIFTS



COMPLEX IONS



PERIODIC TABLE OF THE ELEMENTS

		Relative atomic mass																																	
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