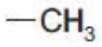
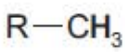
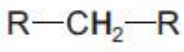
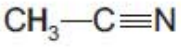
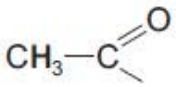
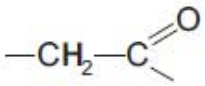
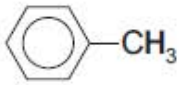
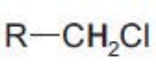
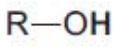
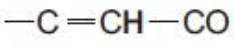
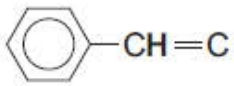
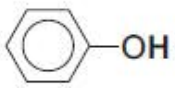
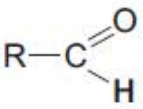
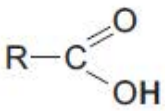
WJEC Eduqas A LEVEL in CHEMISTRY

Data Booklet

Infrared absorption values

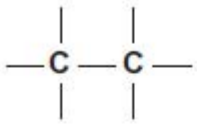
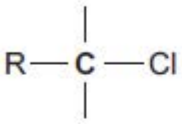
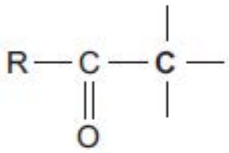
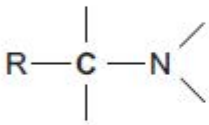
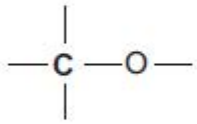
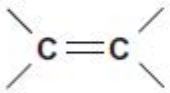
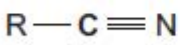
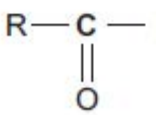
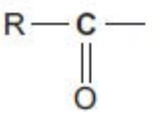
Bond	Wavenumber (cm^{-1})
C — Br	500 to 600
C — Cl	650 to 800
C — O	1000 to 1300
C = C	1620 to 1670
C = O	1650 to 1750
C ≡ N	2100 to 2250
C — H	2800 to 3100
O — H (carboxylic acid)	2500 to 3200 (very broad)
O — H (alcohol/ phenol)	3200 to 3550 (broad)
N — H	3300 to 3500

^{1}H NMR chemical shifts relative to TMS = 0

Type of proton	Chemical shift, δ (ppm)
	0.1 to 2.0
	0.9
	1.3
	2.0
	2.0 to 2.5
	2.0 to 3.0
	2.2 to 2.3
	3.3 to 4.3
	4.5 *
	5.8 to 6.5
	6.5 to 7.5
	7.0 *
	9.8 *
	11.0 *

*variable figure dependent on concentration and solvent

^{13}C NMR chemical shifts relative to TMS = 0

Type of carbon	Chemical shift , δ (ppm)
	5 to 40
	10 to 70
	20 to 50
	25 to 60
	50 to 90
	90 to 150
	110 to 125
	110 to 160
 (carboxylic acid / ester)	160 to 185
 (aldehyde / ketone)	190 to 220

THE PERIODIC TABLE