Reactions of Organic Chemistry
Revision for A Level Examination

	Purpose	Reagent	Conditions	Observations/remarks
Alkenes (C=C)				
Electrophilic Addition	C=C → RX addition of halogen	X_2(l) in CCl_4	room temp, absence of UV	Reddish brown (or whatever applicable) decolourises
	C=C → RX addition of hydrogen halide	HX(g)	room temp (HX is polar, lower temp)	reactivity: HI>HBr>HCl>HF size of X ↓, length of H-X ↓, overlap ↑, strength ↑
	C=C → ROH Addition of water	H_2O(g), conc.H_3PO_4 (cat)	300°C, 60atm	For Industrial
		#1: conc.H_2SO_4	room temperature	For Laboratory (2 steps)
		#2: H_2O(l)	heat	
[R]	C=C → C–C Used in production of margarine (hardening oils to produce solid fats)	H_2	Ni catalyst with heat OR Pt/Pd catalyst, room temp	
Mild [O]	Distinguishing test for C=C and multiple bonds in alkene C=C forms diol while C≡C forms carboxylic acids	Dilute $KMnO_4$, H_2SO_4 (aq)	Cold	Purple $KMnO_4$ decolourises brown ppt of MnO_2 formed (for alkali medium only)
		Dilute $KMnO_4$, NaOH (aq)		
Strong [O]	Formation of CO_2, carboxylic acid or ketone helps to determine the position of the C=C double bond	Conc. $KMnO_4$, H_2SO_4 (aq)	Heat	
		Conc. $KMnO_4$, NaOH (aq)		
Arenes (B)				
Electrophilic Substitution	Nitration of benzene	conc. HNO_3, conc H_2SO_4 (cat)	Heat under reflux at 55°C	Yellow oil (nitrobenzene, b.p. 210°C) formed
	Nitration of methyl benzene	conc. HNO_3, conc H_2SO_4 (cat)	30°C	Mixture of 2-nitro and 4-nitro
	Halogenation of benzene and methylbenzene X = Cl or Br	X_2(g/l); anhydrous FeX_3/AlX_3 or Fe (cat)	Room temperature (for latter: absence of UV light)	Steamy white fumes of HX(g) evolved, yellowish green Cl_2/reddish-brown Br_2 decolorises
	Preparation of methylbenzene	CH_3Cl; anhydrous $FeCl_3$ or $AlCl_3$	Room temperature	
[O]	Side chain oxidation	$KMnO_4$(aq) (only this can)	Heat	White ppt of benzoic acid formed, purple $KMnO_4$ decolourised

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Page 1 of 5