Assigning ON for organic compounds

carbon will alter its O.N depending on what it is bonded to

① Draw out the organic compound

② Assign ON for

i) hydrogen : +1 iii) halogen : -1

ii) oxygen : -2

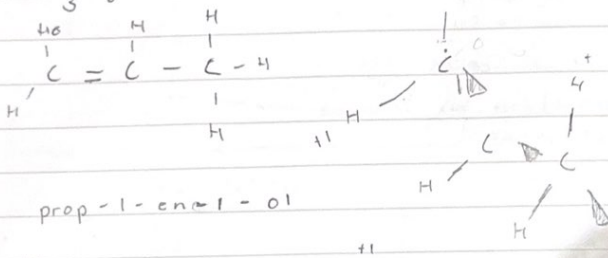
③ Assume all carbons start at ON = 0 then :

a) for each C-H bond, Decrease O.N by 1

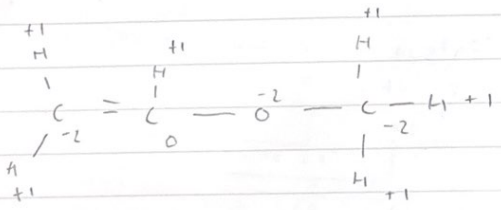
b) for each C-O bond, increase O.N by 1

c) for each C - more , increase O.N by 1
EN-atom

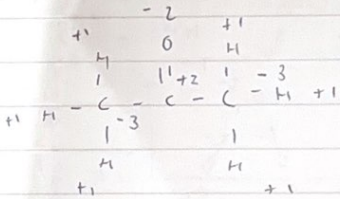
Ex C_3H_6O



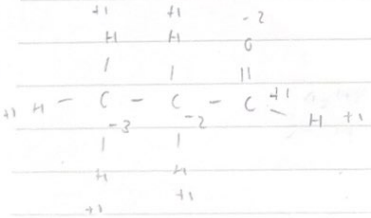
prop-1-en-1-ol



methoxy eth-1-ene



propan-2-one



Balancing equation using ON method

① write balanced equation

② Assign all ON

③ Focus on elements that changed their O.N from left side to right side

if the ON becomes more positive = loss e^- = oxidation

if the ON becomes more negative = gain e^- = reduction

④ If left side ≠ right side for element that has changed ON, then multiply by a coefficient to match them up

ex. $I_2 \longrightarrow 2I^-$

0 → -1 gained $1e^-/I$ = reduction

since there are two I, total gain of $2e^-$

⑤ Adjust coefficients to balanced the e^- gained / lost

lock in coefficient after e^- gained / lost are balanced

⑥ Balance by inspection

$2Al_{(s)} + 3Cu(SO_4) \longrightarrow 3Cu + Al_2(SO_4)_3$

ON: 0 → 0

Cu^{2+} SO_4^{2-} → Al^{3+} SO_4^{2-}

+2 gained $2e^-/Cu$ ×3 +6 -2

S +6 O_4 -2

loss $3e^-/Al$ × 2

$8H^+ + 10NO_3^- + I_2 \longrightarrow 2IO_3^- + 10NO_2 + 4H_2O$

+5 -2 0 → +5 -2 +4 -2 +1 -2

lost $5e^-/N$ ×2

gained $1e^-/N$ × 10

Example 3

check charges

$$H_2O + 2MnO_4^- + 3Ni \longrightarrow 2MnO_2 + 3NiO + 2OH^-$$

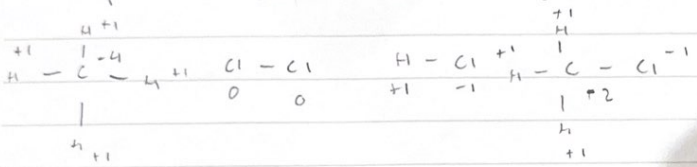
+1 -2 | +7 -2 | 0 | +4 -2 | +2 -2 | -2 +1

gained $3e^-$/Mn x 2

lost $2e^-$/Ni x 3

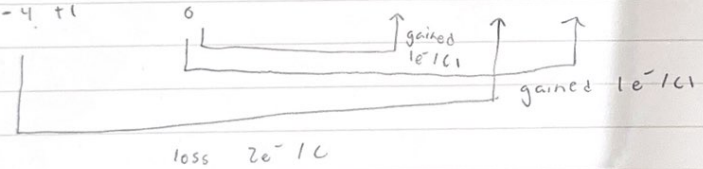
Example 4

$$CH_4 + Cl_2 \longrightarrow HCl + CH_3Cl$$



$$CH_4 + Cl_2 \longrightarrow HCl + CH_3Cl$$

-4 +1 | 0 | +1 -1 | -2 +1 -1



9 6

$$2H_2O + 2PbSO_4 \longrightarrow Pb + PbO_2 + 2SO_4^{2-} + 4H^+$$

+1 -2 | +2 +6 -2 | 0 | +4 -2 | +6 -2 | +1