① Perbandingan mol (n)

gas ideal ⇒ $PV = n.R.T$

R = tetapan Rydberg = 0,082 $\frac{L\,atm}{mol.K}$

$$\frac{V}{n} = \frac{R.T}{P} \rightarrow \text{Konstan}$$

$$\frac{V_1}{n_1} = \frac{V_2}{n_2}$$

② Mencari nilai mol (n)

$$n = \frac{gram}{Ar} \quad \text{atau} \quad m = \frac{gram}{Mr}$$

Mr = massa molekul relatif

∴ Mr H_2O = 2 x Ar H + 1 x Ar O
= 2 x 1 + 1 x 16
= 18

$n = \frac{V_{STP}}{22,4}$, STP = standar temperatur and pressure

$n = \frac{P.V}{R.T}$, gas ideal

$n = \frac{V_{RTP}}{24}$, RTP = Room Temp. and Pressure

$$n = \frac{\Sigma \text{Partikel}}{6,02 \times 10^{23}}$$

③ Menyetarakan Persamaan Reaksi

> Sederhana

$$C_{(s)} + \frac{1}{2} O_{2(g)} \rightarrow CO_{(g)}$$

(menyamakan jumlah atom Kiri & kanan)

Fase/wujud unsur & senyawa

s (solid) = padat
l (liquid) = cair

aq (aquo) = berair

g (gases) = gas

> Hidrokarbon

$$C_2H_{4(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(g)}$$

» menyamakan jumlah atom C kiri & kanan
($C_2H_4 \rightarrow 2CO_2$)

» menyetarakan jumlah atom H Kiri & kanan
($C_2H_4 \rightarrow 2H_2O$)

» menyetarakan atom O kiri & kanan
($3O_2 \rightarrow 2(O_2 + 2H_2O)$)

> Kompleks

$C_2H_{4(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(g)}$

Cara :

$a\ C_2H_4 + b\ O_2 \rightarrow c\ CO_2 + d\ H_2O$

C (karbon) → $2a = c$

H (hidrogen) → $\cancel{4}^{2}a = \cancel{2}d$

$2a = d$

O (oksigen) → $2b = 2c + d$

maka :

misal $a = 1$, $2a = c$

$2.1 = c$

$c = 2$

$2a = d$

$2.1 = d$

$2 = d$

$2b = 2c + d$

$2b = 2.2 + 2$

$b = 2 + 1 = 3$

④ Mencari Biloks

MnO_2

$x + 2(-2) = 0$

$x - 4 = 0$

$x = 4$

⑤ Reduksi (penurunan Biloks)

> $\underset{+4\ -2}{CO_2(g)} \rightarrow \underset{0}{C(s)} + O_2(g)$

+4 ↓R 0

Oksidator : CO_2
Hasil Reduksi : C

⑥ Oksidasi (kenaikan biloks)

> $\underset{0}{C(s)} + O_2(g) \rightarrow \underset{+4\ -2}{CO_2}(g)$

0 ↑oks +4

Reduktor : C
Hasil oksidasi : CO_2

⑦ Molaritas (M)

$$M = \frac{gram}{Mr} \times \frac{1000}{V}$$

⑧ Massa Jenis (ρ)

$$\rho = \frac{gram}{mL} \text{ atau } \frac{kg}{\ell}$$

⑨ Molalitas (m)

$$n = \frac{gram}{Mr} \times \frac{1000}{gram\ pelarut}$$

(10) Asam-Basa (pH & pOH)

> Asam Kuat

mis: H_2SO_4

$$H_2SO_4 \rightarrow 2H^+ + SO_4^{2-}$$

valensi = 2

$$[H^+] = \text{valensi} \times Ma$$

$$pH = -\log[H^+]$$

> Asam Lemah

mis: CH_3COOH

$$[H^+] = \sqrt{Ka \cdot Ma}$$

$$pH = -\log[H^+]$$

> Basa Kuat

mis: $NaOH$

$$NaOH \rightarrow Na^+ + 1.OH^-$$

valensi = 1

$$[OH^-] = \text{valensi} \times M_b$$

$$pOH = -\log[OH^-]$$

$$pH = 14 - pOH$$

> Basa Lemah

mis: NH_3

$$[OH^-] = \sqrt{Kb \cdot Mb}$$

$$pOH = -\log[OH^-]$$

$$pH = 14 - pOH$$

⑪ Hidrolisis

> Asam Lemah - Basa kuat

$$[OH^-] = \sqrt{\frac{Kw}{Ka} \times [G]}$$

$Kw = 10^{-14}$

Ka = diket di soal / 10^{-5}

> Asam Kuat - Basa Lemah

$$[H^+] = \sqrt{\frac{Kw}{Kb} \times [G]}$$

Kb = diket di soal / 10^{-5}

> Asam Kuat - Basa kuat (tidak terhi - drolisis)

> Asam Lemah - Basa Lemah (hidrolisis sempurna)

$[H^+]$ tidak bergantung pada konsentrasi garam, tetapi pada Ka dan Kb

$Ka = Kb \rightarrow pH\ 7$

$Ka > Kb \rightarrow pH < 7$

$Ka < Kb \rightarrow pH > 7$

$$\text{Derajat Hidrolisis (h)} = \frac{[G] \text{ urai}}{[G] \text{ mula}^2}$$

Ingat hidrolisis: sisa garam