① Som lading:

$+ \; 1.0{,}4 + 2.0{,}1 + 3.0{,}2 = 1{,}2$

$- \; 1{,}2 = 1.0{,}3 + X \Rightarrow X = 1{,}2 - 0{,}3$

$= 0{,}9$

$\Rightarrow Cl^- = 0{,}9 \text{ mol}$ (A)

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② A $\begin{cases} {}^{72}Ge^{3+} \rightarrow 32 \rightarrow 72-32 = 40\,n,\ e^- = 32-3 = 29 \\ {}^{70}Zn^{2+} \rightarrow 30 \rightarrow 70-30 = 40\,n,\ e^- = 30-2 = 28 \end{cases}$

B $\begin{cases} {}^{19}F^- \rightarrow 9 \rightarrow 19-9 = 10\,n,\ e^- = 9+1 = 10 \\ {}^{18}O^{2-} \rightarrow 8 \rightarrow 18-8 = 10\,n,\ e^- = 8+2 = 10 \end{cases}$

(B)

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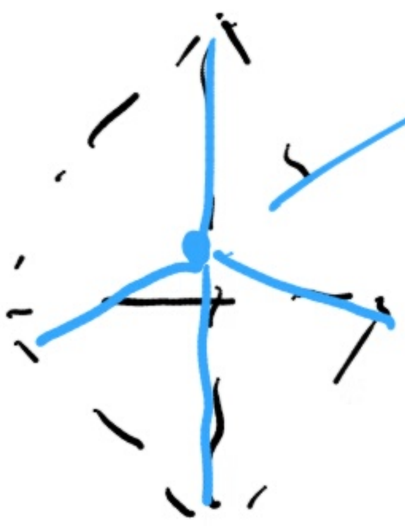
③



Tetraeder

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④ Butaangas = C_4H_{10}

$2\,C_4H_{10} + 13\,O_2 \rightarrow 8\,CO_2 + 10\,H_2O$

$M\ C_4H_{10} = 4 \cdot 12 + 10 \cdot 1 = 58\ g/mol$

$\rightsquigarrow 29\,g \rightarrow \frac{29}{58} = \frac{1}{2}\ mol$

$2\,C_4H_{10} + 13\,O_2 \rightarrow 8\,CO_2 + 10\,H_2O$

$2 \quad 13 \quad 8 \quad 10$ } mol

$0{,}5 \quad 13/4 \quad 8/4 \quad 10/4$

$V = V_0 \cdot \mu = 22{,}4\ l/mol \cdot \frac{13}{4}\ mol$

$= 5{,}6 \cdot 13 = 72{,}8\ l$

(B)

5)

$$2\,MnO_4^- + 5\,H_2O_2 + 6\,H^+ \rightarrow 2\,Mn^{2+} + 5\,O_2 + 8\,H_2O$$

2 5 6 2 5 8 mol

$n\ KMnO_4 \rightarrow 35\ mL \quad 0,1\ mol/L$

$0,0035 \cdot 0,1 = 0,00035\ mol$

$0,00035 \qquad 0,00035 \cdot \frac{5}{2}$

$$C = \frac{n}{V} = \frac{0,0035 \cdot 5}{2 \cdot 0,05} = \frac{0,00175}{0,01}$$

$0,01$

$= 0,175\ mol/L$

B

(6) $A + B \rightarrow AB$ $\quad [A_0] = [B_0] = 0{,}4 \ mol/\ell$

$1 \rightarrow 2$ $\quad A \rightarrow \times 2$ $\quad B \rightarrow =$ $\quad v \rightarrow \times 4$ $\quad \rightarrow v \sim [A]^2$

$2 \rightarrow 3$ $\quad A \rightarrow =$ $\quad B \rightarrow \times 2$ $\quad v \rightarrow \times 2$ $\quad \rightarrow v \sim [B]$

$$v \sim [A]^2 [B]$$

$$v = k [A]^2 [B] \rightarrow k = \frac{v}{[A]^2 [B]}$$

$$\text{init } 1 \rightarrow k = \frac{1}{0{,}1^2 \cdot 0{,}1}$$

$$k = \frac{1}{\left(\frac{1}{10}\right)^3} = 1000$$

$$\Rightarrow v = 1000 \cdot 0{,}4^2 \cdot 0{,}4 = \cancel{1000} \cdot \frac{4^3}{\cancel{10^3}}$$

$$v = 64 \ mol/\ell \cdot s$$

A

(7) $SO_2 + NO_2 \rightleftharpoons SO_3 + HO$ $\quad K_c = 3$ à 450°C

	SO_2	NO_2	SO_3	HO	
init	x	6	0	0	mol
réact	-3	-3	3	3	
éq	$x-3$	3	3	3	

$$K_c = \frac{[SO_3][HO]}{[SO_2][NO_2]} = 3 = \frac{3 \cdot 3}{(x-3) \cdot 3}$$

$$\Rightarrow x - 3 = 1 \Rightarrow x = 4$$ (B)

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(8) $pK_2 = 4$ blanc $[HIn] > 10\,[In^-]$

↳ $K_2 = 10^{-4}$ gel $[In^-] > 10\,[HIn]$

$$HIn \rightleftharpoons H^+ + In^-$$

↓ blanc — ↓ gel base

$$K_2 = 10^{-4} = \frac{[H^+][In^-]}{[HIn]}$$

$$\Rightarrow [H^+] = 10^{-4} \cdot \frac{[HIn]}{[In^-]}$$

(D)

$$\Rightarrow [H^+] \begin{cases} 10^{-4} \cdot 10 = 10^{-3} \Rightarrow pH = 3 \\ 10^{-4} \cdot \frac{1}{10} = 10^{-5} \Rightarrow pH = 5 \end{cases}$$

(a) $NH_4NO_3 \xrightarrow{Fe} NO_2 + 2H_2O$

$-III$ V I

↓ reductor ↘ oxidator

(c)

(b) (c) carbonzuur ?