Avaliação escrita 1

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1 - A) $H_2C_2O_4$ - ácido oxálico

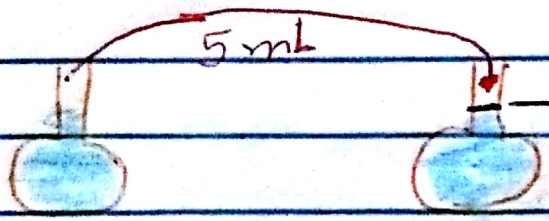
$3,6734\ g \times 0,98 \rightarrow 3,5999 \simeq 3,6\ g$

$3,6\ g\ H_2C_2O_4$
$250\ mL\ H_2O$ $\rightarrow C = 14,4\ g/L$

B) $M = 90,03\ g/mol$

$n = \frac{3,6\ g}{90,03\ g/mol} = 3,99 \cdot 10^{-2}\ mol$

$C = \frac{3,99 \cdot 10^{-2}\ mol}{0,25\ L} = \boxed{0,16\ mol/L}$



$0,16\ \frac{mol}{L}$ C2?

$\frac{0,16\ mol/L \cdot 0,005\ L}{0,1\ L} = \boxed{8 \cdot 10^{-3}\ mol/L}$

2) H_2SO_4 M: 98,079 g/mol d: 1,84 g/cm³ (mL)

pureza: 95% (m/m)

↳ 95 g H_2SO_4 / 100 g "reagente" → prod. comercial

A) 1 L = 1000 mL — 1,84 g/mL

↳ 1,84 Kg/L

1,2 L produto comercial → 95% H_2SO_4

Portanto: $V_{H_2SO_4} = 1,2 \cdot 0,95 =$ **1,14 L**

$m_{H_2SO_4} = 1,14 L \cdot 1,8 Kg/L =$ **2,0976 Kg**

≅

↳ 2,1 Kg H_2SO_4

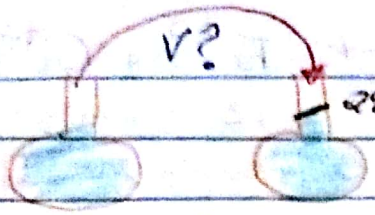
B) 1 mol — 98,079 g

x — 2097,6 g

x = 21,39 mol

$C = \frac{21,39 \text{ mol}}{1,2 L} =$ **17,825 mol/L**

C)



17,825 mol/L 25g/L ou 0,2549 mol/L

$C_1V_1 = C_2V_2$ $V_1 = \frac{C_2V_2}{C_1}$

$V_1 = \frac{0,2549\ mol/L \cdot 0,25\ L}{17,825\ mol/L}$

$V_1 = 3,58 \cdot 10^{-3}\ L$

↳ 3,58 mL

3) A)

$$\underset{0\ +1\ -2}{CH_2O} + \underset{+6\ \ -2}{Cr_2O_7^{-2}} + \underset{+1}{H^+} \rightarrow \underset{+4\ -2}{CO_2} + \underset{+1\ -2}{H_2O} + \underset{+3}{Cr^{+3}}$$

→ $+3\bar{e}$/Cr e $-4\bar{e}$/C

$\Delta Cr = 3\bar{e}\ (\times 2) = 6\bar{e}$

$\Delta C = 4\bar{e} = 4\bar{e}$

Cr = $6\bar{e}$ nCr = $4\bar{e}/2 = 2\bar{e}$ Cr

C = $4\bar{e}$ nC = $6\bar{e}/2 = 3\bar{e}$ C

$$3CH_2O + 2Cr_2O_7^{-2} + H^+ \rightarrow 3CO_2 + H_2O + 4Cr^{3+}$$

↓ Δ6 ↓ 11

$$\underset{+2}{Fe^{+2}} + \underset{+6\ -2}{Cr_2O_7^{2-}} + \underset{+1}{H^+} \longrightarrow \underset{+3}{Fe^{+3}} + \underset{+3}{Cr^{+3}} + \underset{+1\ -2}{H_2O}$$

$+3\bar{e}$ / Cr e $-1\bar{e}$ / Fe

$\Delta Cr: \quad 3.(2) = 6\bar{e}$

$\Delta Fe: \quad 1.(1) = 1\bar{e}$

$Cr = 6\bar{e} \quad - n Cr = 1\bar{e}$

$Fe = 1\bar{e} \quad - n Fe = 6\bar{e}$

$$6Fe^{+2} + 1Cr_2O_7^{2-} + 14H^+ \longrightarrow 6Fe^{3+} + 1Cr^{+3} + 7H_2O$$

B) 134,4 L CO_2 (CNTP)

$$n = \frac{134,4\ L}{22,4\ L/mol} = \boxed{6\ mol}$$

$n\ CH_2O = n\ CO_2$

$m = 6\ mol \cdot 30,031\ g/mol$

$\boxed{m = 180,186\ g}$

4- A) $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$

B) $M\ C_8H_{18} = 114,228\ g/mol$

$n = 3,991\ g\ mol$

$n\ O_2 = \frac{25}{2}\ n.C_8H_{18}$

$nO_2 = 12,5 \cdot 3,991 = 49,88\ mol$

$mO_2 = 1596,74\ g \approx 1,59\ Kg$

C) $1056\ g\ CO_2 \rightarrow 23,994\ mols$

$nC_8H_{18} = \frac{2}{16}\ n\ CO_2 = 2,999\ mols$

$n\ O_2 = \frac{25}{16}\ n\ CO_2 = 37,49\ mol$

$2\ C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$

2,999 37,49 → 23,994

3,999 49,88 → 31,992

$\%R = \frac{23,994}{31,992} \cdot 100 = 75$

5- A) $CaSO_4 \cdot 2H_2O + Al^{3+} \rightarrow Al_2(SO_4)_3 + Ca + H_2O$

$3\,CaSO_4 \cdot 2H_2O + 2Al^{3+} \rightarrow Al_2(SO_4)_3 + 3Ca + 6H_2O$

B) 1kg → 96,5% pureza

→ 0,965kg

$M_{CaSO_4 \cdot 2H_2O} = 172\ g/mol$

$n_{gesso} = \frac{965\ g}{172\ g/mol} = 5,61\ mol$

$n_{Al} = \frac{80\ g}{26,98\ g/mol} = 2,96\ mol$

	$3\,CaSO_4 \cdot 2H_2O$	$+\ 2Al^{3+}$	→
d=	5,61	2,96	
r=	4,44	2,96	
s=	1,17	0	

→ $n_{gesso} = \frac{3}{2}\, n_{Al^{3+}} \rightarrow 4,44\ mol$

- Alumínio está limitando a reação
- O gesso está em excesso, com 201,24g a mais.
- Caso quiséssemos dar continuidade na reação, seria necessário adicionar 0,78 mol de Al^{3+}.