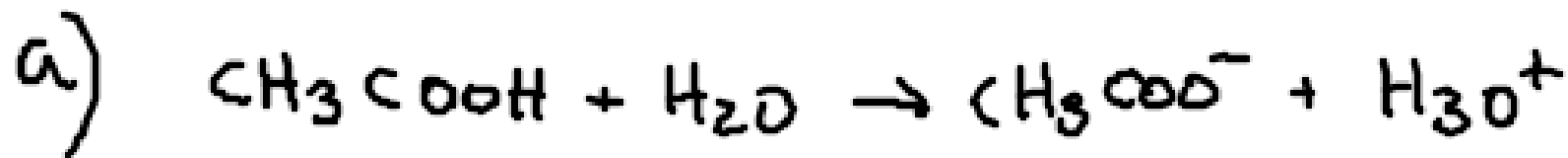


14) pH = 2.4, 100 ml $K_a = 1.8 \cdot 10^{-5}$



b) x

c_r

c_e

y
 $x - y$

y

y

y

y

pH = 2.4 \rightarrow $[\text{H}_3\text{O}^+] = 10^{-2.4} = 0.004$

$$K_a = \frac{[\text{H}_3\text{O}^+] \cdot [\text{CH}_3\text{COO}^-]}{[\text{CH}_3\text{COOH}]}$$

$$1'8 \cdot 10^{-5} = \frac{0'004 \cdot 0'004}{x - 0'004}$$

$$1'8 \cdot 10^{-5} (x - 0'004) = 0'004^2$$

$$1'8 \cdot 10^{-5} x - 7'2 \cdot 10^{-9} = 1'6 \cdot 10^{-5}$$

$$x = 0'9 \text{ M} \Rightarrow \text{inicial}$$

$$M = \frac{n}{V}$$

$$0'9 = \frac{n}{0'1}$$

$$n = 0'9 \cdot 0'1 = 0'09$$

moles de CH_3COOH

b) Finals

$$[\text{H}_3\text{O}^+] = [\text{KCH}_3\text{COO}^-] = 0'004$$

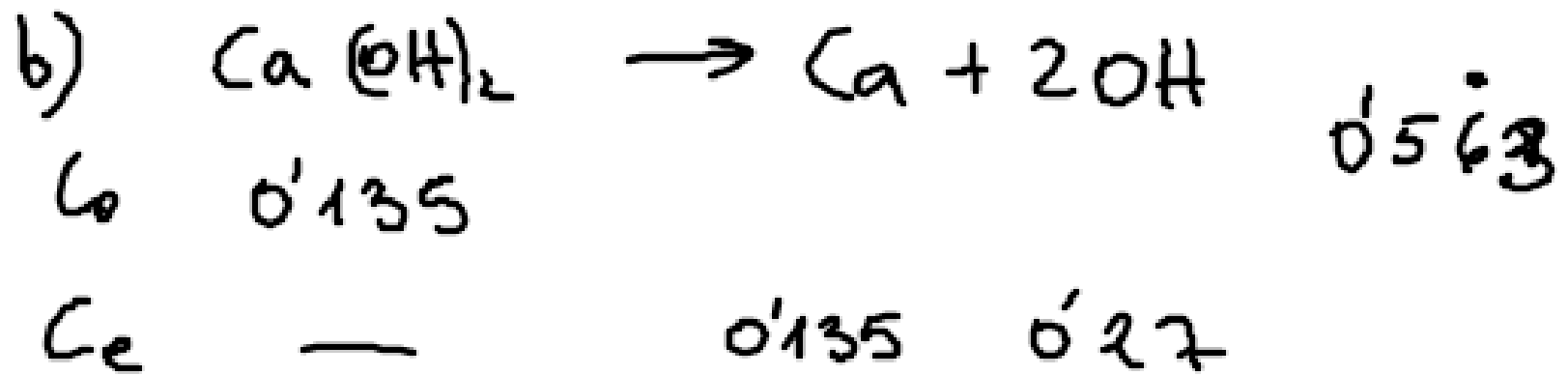
$$[\text{CH}_3\text{COOH}] = 0'9 - 0'004 = 0'896$$

15] $V = 200 \text{ ml} = 0.2 \text{ l}$

a) 2 g de Ca(OH)_2 $M_r[\text{Ca(OH)}_2] = 74 \text{ g/mol}$

$$2 \text{ g} \cdot \frac{1 \text{ mol}}{74 \text{ g}} = 0.027$$

$$M = \frac{n}{V} = \frac{0.027}{0.2} = 0.135 \text{ M}$$



$$p_{\text{OH}} = -\log[\text{OH}^-] = -\log 0'27 = 0'57$$

$$p_{\text{H}} = 14 - p_{\text{OH}} = 14 - 0'57 = 13'43$$



25 ml de 0.1 M de HCl

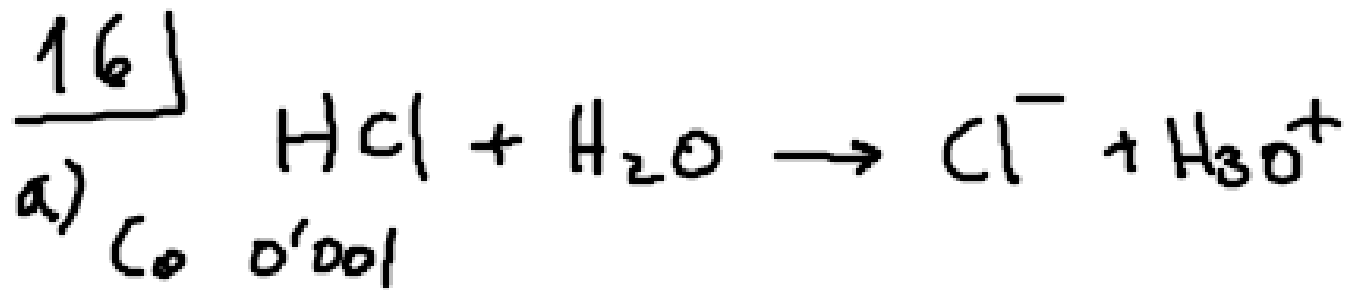
x ml de $\text{Ca}(\text{OH})_2$ 0.135 M

$$0.1 = \frac{n_{\text{HCl}}}{0.025} \rightarrow n_{\text{HCl}} = 0.0025$$

$$0.0025 \text{ moles HCl} \cdot \frac{1 \text{ mol Ca}(\text{OH})_2}{2 \text{ moles HCl}} = 0.00125 \text{ moles Ca}(\text{OH})_2$$

$$0.135 = \frac{0.00125}{V_{\text{Ca}(\text{OH})_2}} \rightarrow V_{\text{Ca}(\text{OH})_2} = \frac{0.00125}{0.135} = 0.009 \text{ litros}$$

$$m = \frac{M \cdot V}{1000}$$



$[\text{H}_3\text{O}^+] = 0,001$

$[\text{H}_3\text{O}^+] - [\text{OH}^-] = 10^{-14}$

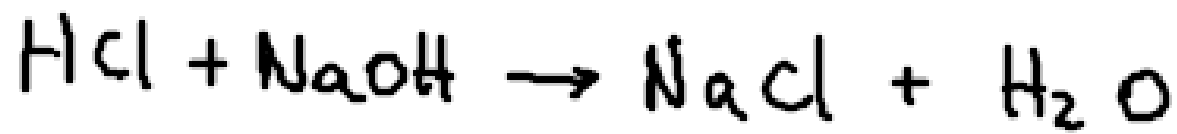
$[\text{OH}^-] = \frac{10^{-14}}{0,001} = 10^{-11}$

$$b) \quad \text{pH} = -\log [\text{H}_3\text{O}^+] = -\log [10^{-3}] = 3$$

$$\text{pOH} = -\log [\text{OH}^-] = -\log [10^{-11}] = 11$$

0'002 M de NaOH ¿V?

100 ml de HCl anterior (0'001 M)



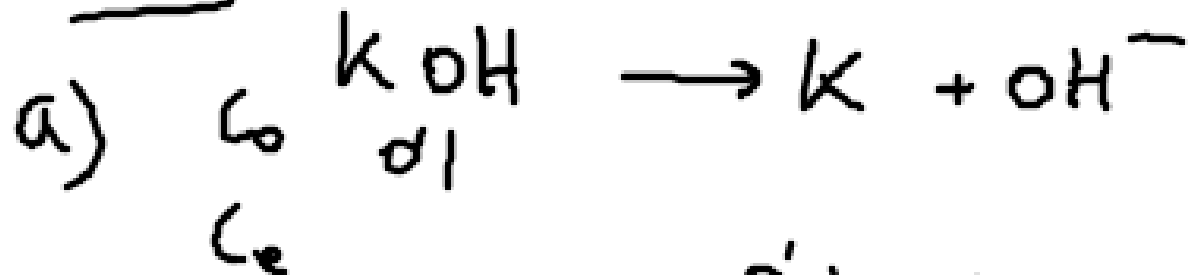
n° moles de HCl

$$M = \frac{n}{V} \rightarrow n = M \cdot V = 0'001 \cdot 0'1 = 0'0001 \text{ moles HCl}$$

necesito 1 mol de NaOH

$$M = \frac{n}{V} \rightarrow V = \frac{n}{M} = \frac{0'0001}{0'002} = 0'05 \text{ l} \rightarrow 50 \text{ ml}$$

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$pH=13 \rightarrow pOH=1 \rightarrow [OH^-] = 10^{-1} = 0.1 M$

0.1 M de 250 ml

$M = \frac{n}{V} \rightarrow n = M \cdot V = 0.1 \cdot 0.25 = 0.025 \text{ moles KOH}$

$M_r(KOH) = 56 \text{ g/mol}$

$0.025 \text{ moles} \cdot \frac{56 \text{ g}}{1 \text{ mol}} = 1.4 \text{ g de KOH}$



$$0,50 \text{ ml de KOH } 0,1 \text{ M} \rightarrow n = m \cdot v = 0,1 \cdot 0,005 = 0,0005$$

hacen falta 0,0005 moles HCl

moles KOH

$$m = \frac{n}{v} \rightarrow v = \frac{n}{m} = \frac{0,0005}{0,2} = 0,0025 \text{ l} \rightarrow 25 \text{ ml}$$

Pasos para neutralización

1- Reacción de neutralización

2- Calcular n de moles de uno $n = m \cdot V$

3- " " " " del otro mediante
la ecuación química

4- Calcular el volumen $V = \frac{n}{m}$

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