14) pH = 2'4 , 100 ml $K_a = 1'8 \cdot 10^{-5}$

a) $CH_3COOH + H_2O \rightarrow CH_3COO^- + H_3O^+$

c_0	x		
c_r	y	y	y
c_e	x − y	y	y

$pH = 2'4 \rightarrow [H_3O^+] = 10^{-2'4} = 0'004$

$K_a = \dfrac{[H_3O^+] \cdot [CH_3COO^-]}{[CH_3COOH]}$

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

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

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

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

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

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

$n = 0'9 \cdot 0'1 = 0'09$ moles de CH_3COOH

b) Finales

$[H_3O^+] \approx [CH_3COO^-] = 0'004$

$[CH_3COO.H) \approx 0'9 - 0'004 = 0'896$

15] $V = 200\,ml = 0'2\,l$

a) $2\,g$ de $Ca(OH)_2$ $\quad Mm[Ca(OH)_2] = 74\,g/mol$

$$2\,g \cdot \frac{1\,mol}{74\,g} = 0'027$$

$$M = \frac{n}{V} = \frac{0'027}{0'2} = 0'135\,M$$

b) $Ca(OH)_2 \longrightarrow Ca + 2OH$ $\quad 0'563$

$C_0 \quad 0'135$

$C_e \quad — \quad 0'135 \quad 0'27$

$pOH = -\log [OH^-] = -\log 0'27 = 0'57$

$ph = 14 - pOH = 14 - 0'57 = 13'43$

c) $2HCl + Ca(OH)_2 \longrightarrow CaCl_2 + 2H_2O$

25ml de 0'1M de HCl

2 ml de $Ca(OH)_2$ 0'135 M

$0'1 = \frac{n_{HCl}}{0'025} \rightarrow n_{HCl} = 0'0025$

$0'0025 \text{ moles HCl} \cdot \frac{1 \text{ mol } Ca(OH)_2}{2 \text{ moles HCl}} = 0'00125 \text{ moles } Ca(OH)_2$

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

$0'135 = \frac{0'00125}{V_{Ca(OH)_2}} \rightarrow V_{Ca(OH)_2} = \frac{0'00125}{0'135} = 0'009 \text{ L} (9 \text{ ml})$

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a) $HCl + H_2O \rightarrow Cl^- + H_3O^+$

C_o 0'001

C_e — 0'001 0'001

$[H_3O^+] = 0'001$

$$[H_3O^+] \cdot [OH^-] = 10^{-14}$$

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

b/ $pH = -\log[H_3O^+] = -\log[10^{-3}] = 3$

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

0'002 M de NaOH 2V?

100ml de HCl anterior (0'001 M)

$HCl + NaOH \rightarrow NaCl + H_2O$

n= moles de HCl

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

necesito 1 mol de NaOH

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

| 9 |

a) $KOH \longrightarrow K + OH^-$

C_0 0'1

C_e 0'1 0'1

$pH = 13 \rightarrow pOH = 1 \rightarrow [OH^-] = 10^{-1} = 0'1\ M$

0'1 M de 250 ml

$M = \frac{n}{V} \rightarrow n = M \cdot V = 0'1 \cdot 0'25 = 0'025$ moles KOH

$M_r(KOH) = 56\ g/mol$

$0'025\ moles \cdot \frac{56\ g}{1\ mol} = 1'4\ g$ de KOH

b) $KOH + HCl \longrightarrow KCl + H_2O$

0'50 ml de KOH 0'1 M $\Rightarrow n = M \cdot V = 0'1 \cdot 0'05 =$

$= 0'0005$

moles KOH

Hacen falta 0'0005 moles HCl

$M = \frac{n}{V} \rightarrow V = \frac{n}{M} = \frac{0'0005}{0'2} = 0'025\ l \rightarrow 25\ ml$

Pasos para neutralización

1- Reacción de neutralización

2- Calculo nº de moles de una $n = m \cdot V$

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

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