

ESERCIZIO 1

$$x \cdot (55,84 + 15,93) + y \cdot (55,84 \times 2 + 15,99 \times 3) = 1$$

$$x \cdot 55,84 + 2y \cdot 55,84 = 0,738$$

$$x = \text{FeO}$$

$$y = \text{Fe}_2\text{O}_3$$

$$71,83x + 159,65y = 1$$

$$55,84x + 111,68y = 0,738$$

$$x = \frac{1 - 159,65y}{71,83}$$

$$\frac{55,84}{71,83} (1 - 159,65y) + 111,68y = 0,738$$

$$0,777 - 124,1y + 111,68y = 0,738$$

$$-12,41y = -0,039$$

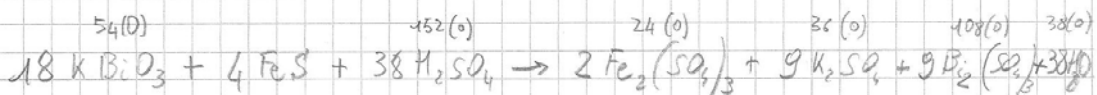
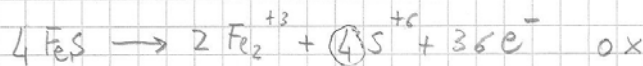
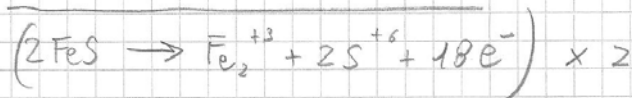
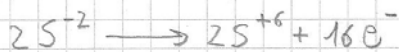
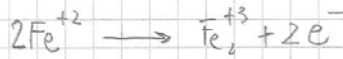
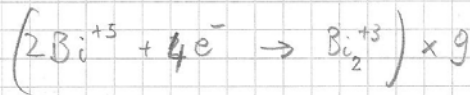
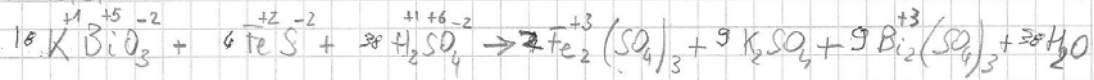
$$y = 0,00314 \quad 3,14 \cdot 10^{-3} \text{ moli di } \text{Fe}_2\text{O}_3$$

$$x = 0,00693 \quad 6,93 \cdot 10^{-3} \text{ moli di } \text{FeO}$$

$$\text{moli di } \text{H}_2 = 6,93 \cdot 10^{-3} + 9,39 \cdot 10^{-3} = 1,63 \cdot 10^{-2}$$

$$V = \frac{1,63 \cdot 10^{-2} \cdot 0,0821 \cdot 273,15}{1} = \underline{\underline{0,366}} \text{ NE}$$

ESERCIZIO 2



$$P.P(KBiO_3) = (39,1 + 208,98 + 48) = 296,08$$

$$P.P(FeS) = (55,84 + 32,06) = 87,9$$

$$P.P(H_2SO_4) = (2,016 + 32,06 + 64) = 98,02$$

$$10 / 296,08 = 0,0337 \text{ moli di } KBiO_3$$

IN DIFETTO

$$0,0337 / 18 = 1,87 \cdot 10^{-3} \text{ equiv.}$$

$$10 / 87,9 = 0,113 \text{ moli di } FeS$$

$$0,113 / 4 = 2,8 \cdot 10^{-2} \text{ equiv.}$$

$$10 / 98,02 = 0,102 \text{ moli di } H_2SO_4$$

$$0,102 / 38 = 2,67 \cdot 10^{-3} \text{ equiv.}$$

$$\text{moli di } K_2SO_4 = 0,0337 / 2 = \underline{\underline{0,0168}}$$

$$P.P(K_2SO_4) = 174,2$$

$$g \text{ di } K_2SO_4 = 0,0168 \times 174,2 = \underline{\underline{2,92 g}}$$

ESERCIZIO 3

$$1,257 \text{ g di } \text{HNO}_3 =$$

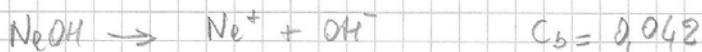
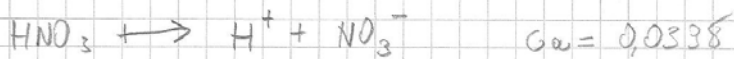
$$P.f. (\text{HNO}_3) = (1,008 + 14 + 48) = 63,008$$

$$1,257 / 63,008 = 0,0199 \text{ moli di } \text{HNO}_3 \quad 140 \text{ ml} = 0,14 \text{ l}$$

$$0,14 \times 0,15 = 0,021 \text{ moli di } \text{NaOH}$$

$$\frac{0,0199}{0,5} = 0,0398 \quad [\text{HNO}_3]$$

$$\frac{0,021}{0,5} = 0,042 \quad [\text{NaOH}]$$



$$[\text{H}^+] + [\text{Na}^+] = [\text{NO}_3^-] + [\text{OH}^-]$$

$$[\text{H}^+] + C_b = C_a + \frac{K_w}{[\text{H}^+]}$$

$$[\text{H}^+]^2 + (C_b - C_a)[\text{H}^+] - K_w = 0$$

appena $0,042 - 0,0398 = 2,2 \cdot 10^{-3}$ eccesso di base rispetto all'acido -

$2,2 \cdot 10^{-3} \rightarrow 10^{-6} \Rightarrow$ trascurare auto ionizzazione

$$[\text{OH}^-] = 2,2 \cdot 10^{-3}$$

$$\text{pOH} = 2,65$$

$$\text{pH} = 11,34 //$$

ESERCIZIO 4

$PV = nRT$

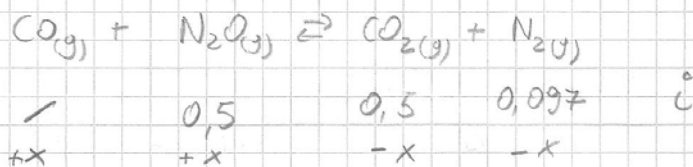
$n = \frac{PV}{RT} = \frac{1 \cdot 4}{0,0821 \cdot 500} = 0,097$ moli di N_2

0,5 moli di CO_2

0,5 moli di N_2O

$P_f(CO) = 28$ $P_f(CO_2) = 44$ $P_f(N_2) = 28$

$P_f(N_2O) = 44$



$K_c = 1,5 \cdot 10^{-2}$

$$1,5 \cdot 10^{-2} = \frac{(0,5-x)(0,097-x)}{x(0,5+x)}$$

$(0,5x + x^2) \cdot 1,5 \cdot 10^{-2} = 0,0485 - 0,5x - 0,097x + x^2$

~~$0,0075x + 1,5 \cdot 10^{-2}x^2 = 0,0485 - 0,5x - 0,097x + x^2$~~

$0,985x^2 - 0,6045x + 0,0485 = 0$

$\frac{0,6045 \pm \sqrt{(0,6045)^2 - 0,191}}{1,97}$

$(0,6045 + 0,4176) / 1,97 = 0,518$

$(0,6045 - 0,4176) / 1,97 = 0,0948$

$x(CO) = 0,0948$; $x(N_2O) = 0,5948$

$x(CO_2) = 0,405$; $x(N_2) = 0,0022$

moli totali = $0,0948 + 0,5948 + 0,448 + 0,0022 = 1,1398$

$\% (CO) = 0,0948 \times 28 = 2,65 \Rightarrow 5,67\%$

$\% (CO_2) = 0,405 \times 44 = 17,82 \Rightarrow 39,15\%$

$\% (N_2O) = 0,5948 \times 44 = 26,17 \Rightarrow 56,0\%$

$\% (N_2) = 0,002 \times 28 = 0,056 \Rightarrow 0,12\%$

46,70 TOT

$P = \frac{1,097 \times 0,0821 \times 500}{4} = 11,25 \text{ Atm}$