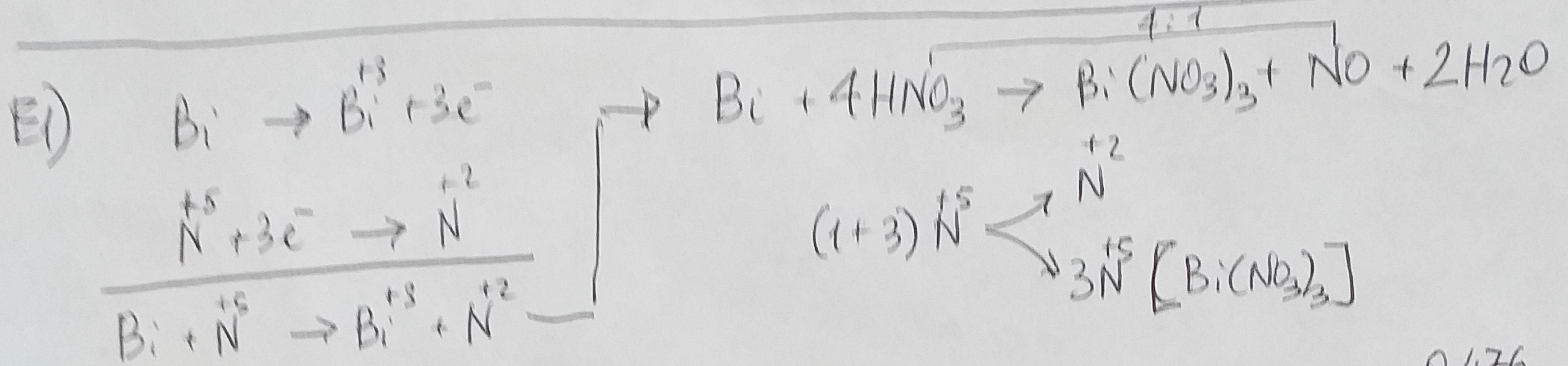


Soluzioni degli esercizi della Prova Scritta di Chimica del
6 Febbraio 2023 (BGER)

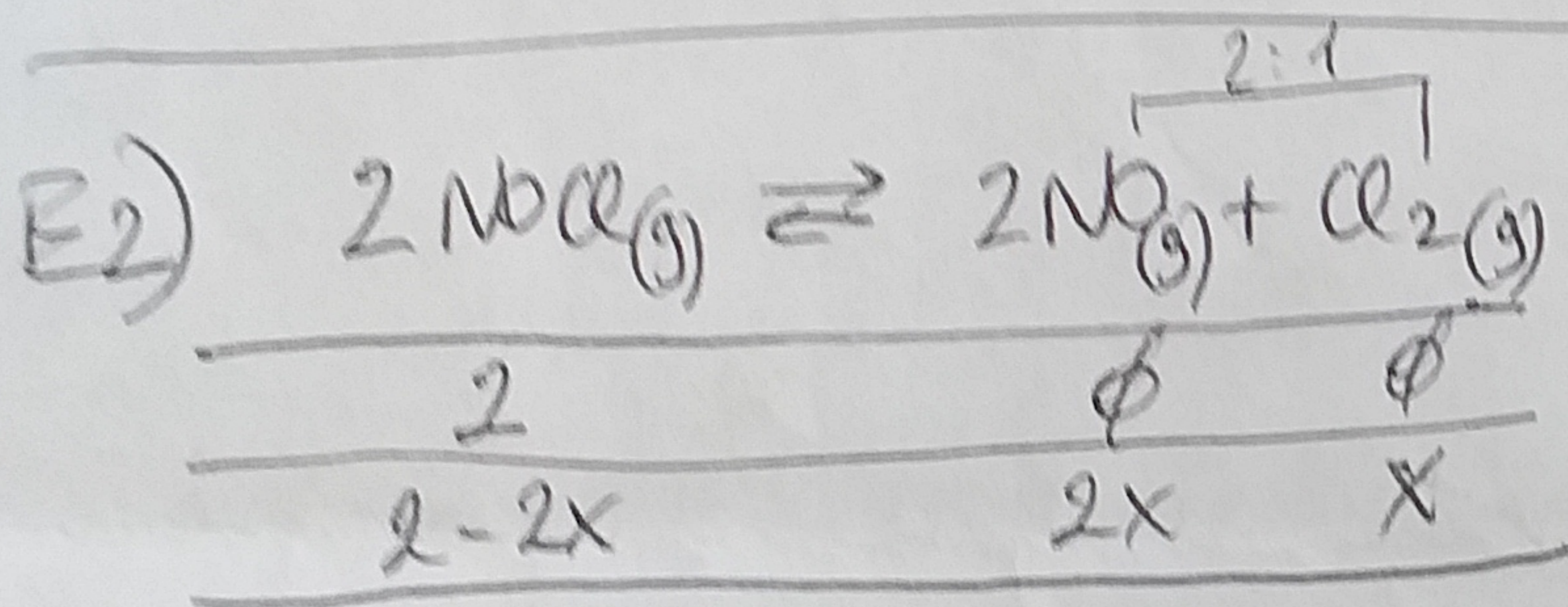


$$n_{\text{Bi}} = \frac{99,5\text{g}}{208,98\text{g/mol}} = 0,476\text{mol}; \quad n_{\text{HNO}_3} = \frac{59,3\text{g}}{63,01\text{g/mol}} = 0,941\text{mol}$$

$$\begin{cases} \rightarrow \frac{0,476}{1} = 0,476 \\ \rightarrow \frac{0,941}{4} = 0,235 \end{cases}$$

$$n_{\text{NO}} = \frac{1}{4} n_{\text{HNO}_3} = 0,235\text{mol}; \quad V = \frac{nRT}{p} = \frac{0,235 \cdot 0,0821 \cdot (273,15 + 35)}{730/760} = 6,20\text{L}$$

$$\text{HNO}_3 \text{ è in difetto}$$



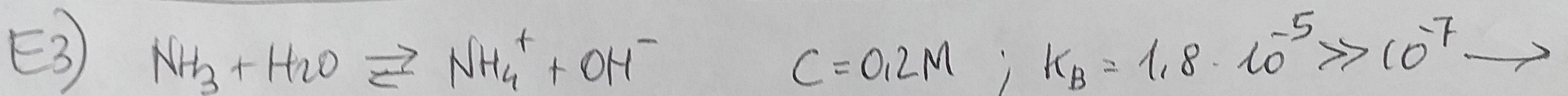
$$p_{\text{NO}} = 2 p_{\text{O}_2} = (2 \cdot 0,2)\text{atm} = 0,4\text{atm}$$

$$p_{\text{O}_2} = 0,2\text{atm}; \quad K_p = \frac{p_{\text{NO}_2}^2 \cdot p_{\text{O}_2}}{p_{\text{NO}}^2}$$

$$\begin{matrix} \rightarrow \\ p_{\text{NO}_2} = y \end{matrix}$$

$$0,01375 = \frac{(0,4)^2 \cdot 0,2}{y^2} \rightarrow y = \sqrt{\frac{(0,4)^2 \cdot 0,2}{0,01375}} = p_{\text{NO}_2} = 1,526\text{atm}$$

$$P_{\text{TOT}} = p_{\text{NO}_2} + p_{\text{NO}} + p_{\text{O}_2} = 1,526 + 0,400 + 0,200 = 2,126\text{atm} \approx 2,13\text{atm}$$



$$[\text{OH}^-] = \frac{K_w}{[\text{H}^+]} + \frac{CK_B}{[\text{OH}^-] + K_B} \rightarrow [\text{OH}^-]^2 + K_B [\text{OH}^-] - CK_B = 0 \rightarrow$$

$$[\text{OH}^-] = \frac{-K_B}{2} + \sqrt{\frac{K_B^2}{4} + CK_B}$$

$$\begin{cases} CK_B = 3,6 \cdot 10^{-6} \\ K_B^2/4 = \frac{3,24 \cdot 10^{-10}}{4} = 8,1 \cdot 10^{-11} \end{cases} \rightarrow CK_B \gg \frac{K_B^2}{4} \rightarrow$$

$$[\text{OH}^-] \approx \sqrt{CK_B} = \sqrt{3,6 \cdot 10^{-6}} = 1,90 \cdot 10^{-3}\text{M} \rightarrow \text{pOH} = 2,72 \rightarrow \text{pH} = 11,28$$