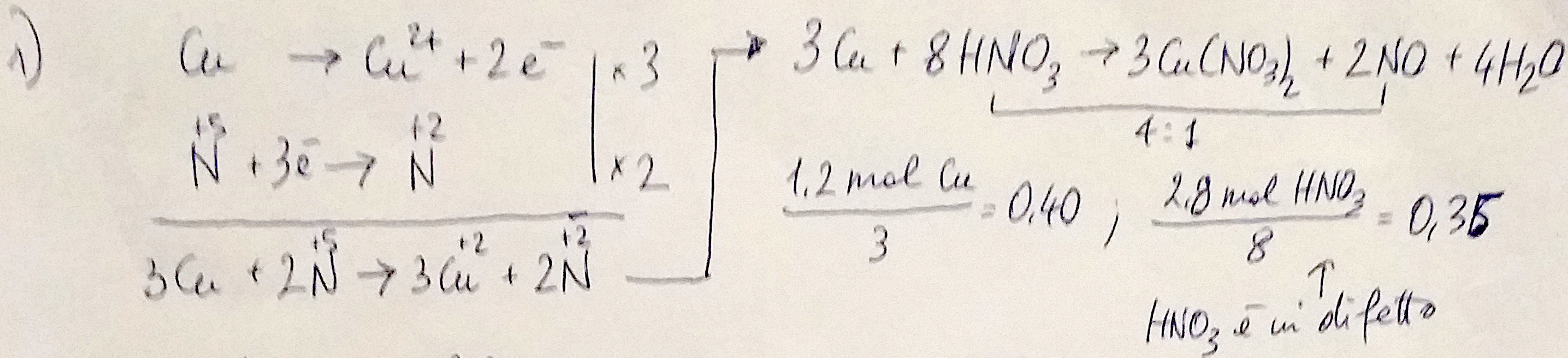
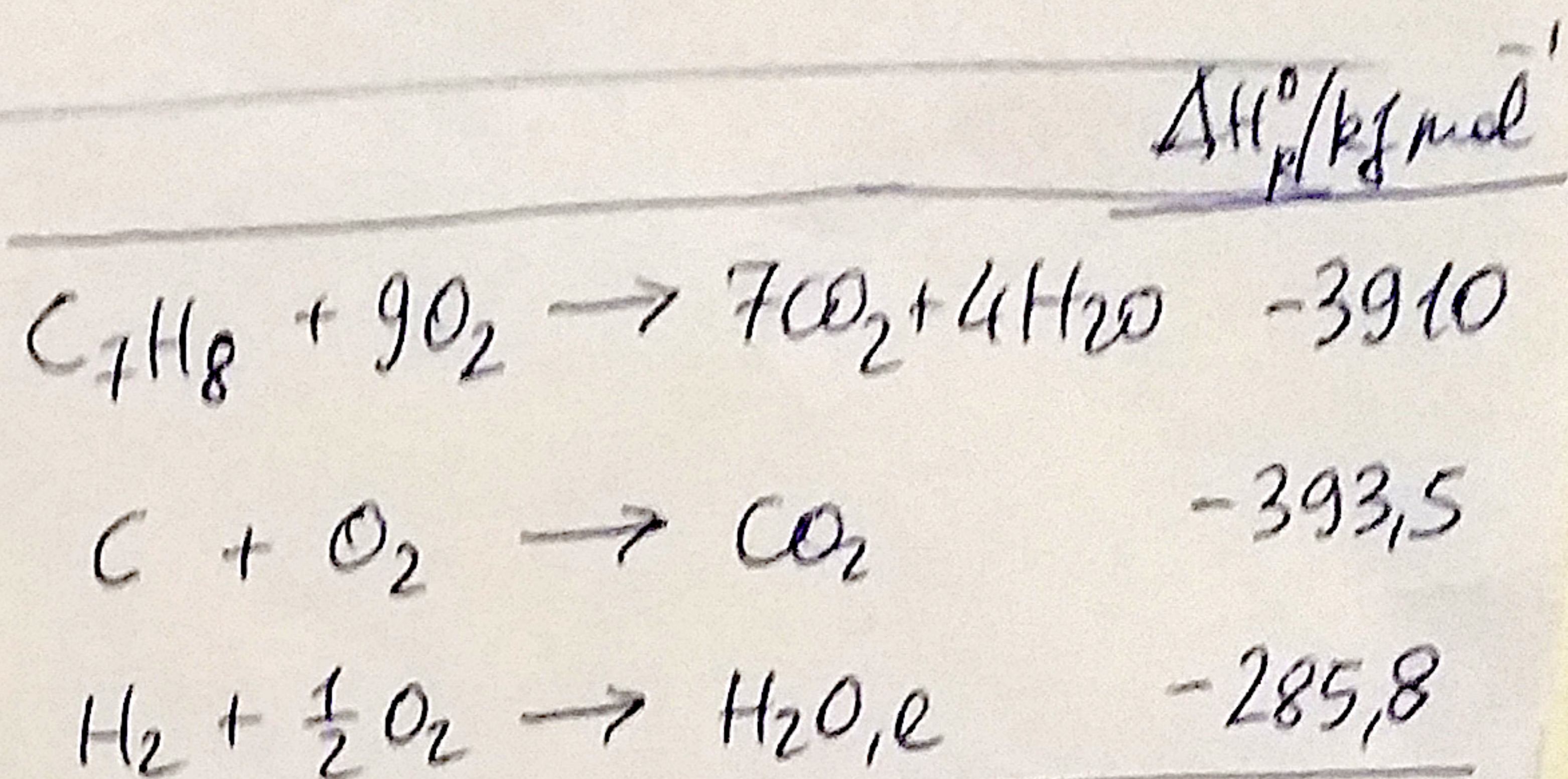
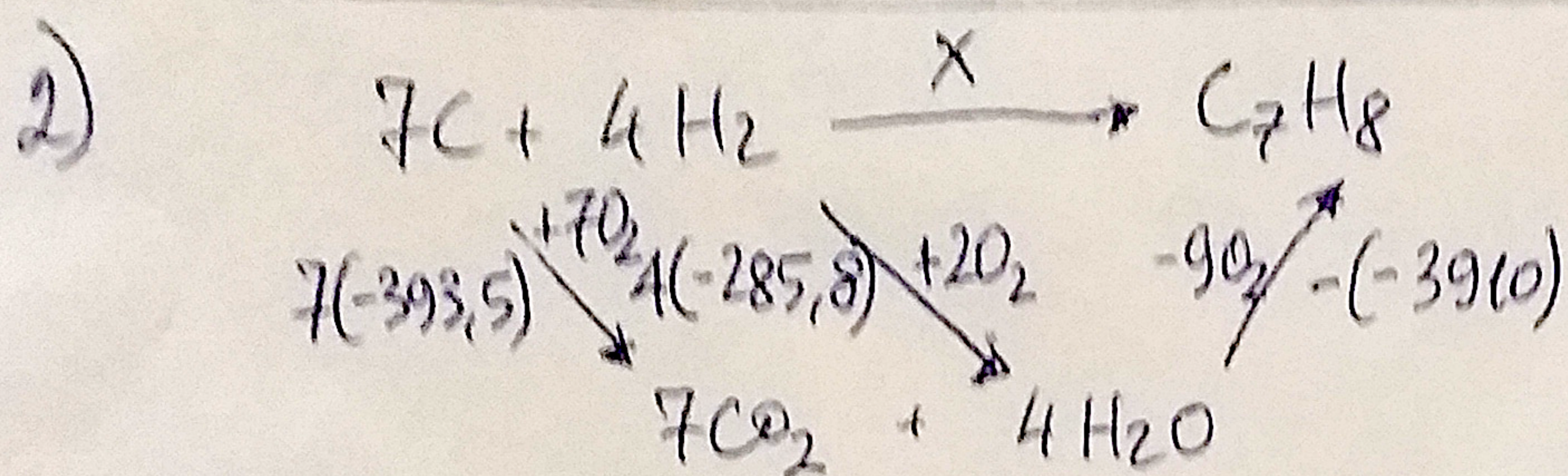


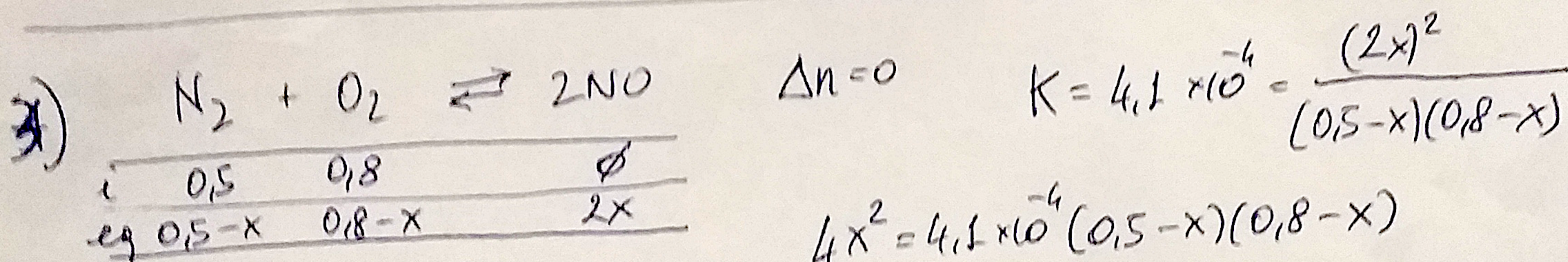
Soluzioni Scritto Chimica BGER 23 Gennaio 2020



$$n_{\text{NO}} = \frac{1}{4} n_{\text{HNO}_3} = \frac{2,8}{4} = 0,7 \text{ mol}$$



$$x = \Delta H_f^\circ(\text{C}_7\text{H}_8, l) = 7(-393,5) + 4(-285,8) + 3910 = +12,3 \text{ kJ/mol}$$



$$n_{\text{N}_2} = 0,5 - x = 0,4937 \text{ mol}$$

$$n_{\text{O}_2} = 0,8 - x = 0,7937 \text{ mol}$$

$$n_{\text{NO}} = 2x = 0,0127 \text{ mol}$$

$$n_{\text{tot}} = 1,3 \text{ mol}$$

$$x_{\text{N}_2} = 0,380$$

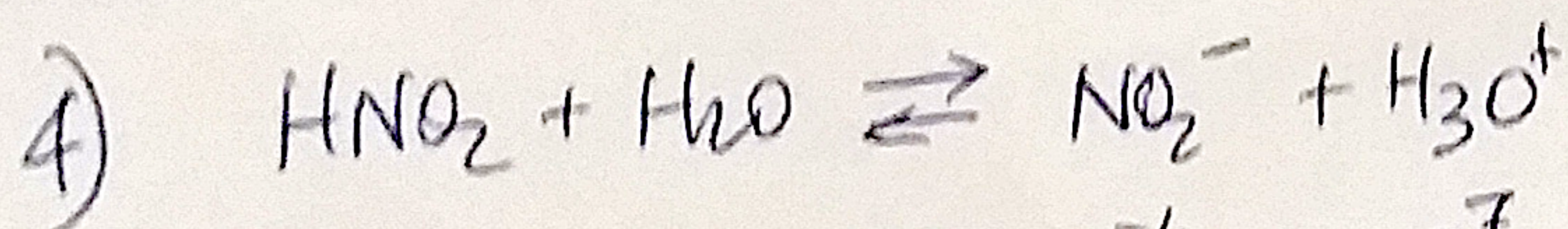
$$x_{\text{O}_2} = 0,611$$

$$x_{\text{NO}} = 0,010$$

$$4x^2 = 4,1 \times 10^{-4} (0,5-x)(0,8-x)$$

$$4x^2 = 1,64 \times 10^{-4} - 5,33 \times 10^{-4} x + 4,1 \times 10^{-4} x^2$$

$$3,9996 x^2 + 5,33 \times 10^{-4} x - 1,64 \times 10^{-4} = 0$$



$$K_a = 7,1 \times 10^{-4} \gg 10^{-7}$$

$$[\text{H}_3\text{O}^+] = \frac{K_w}{[\text{OH}^-]} + \frac{cK_a}{[\text{H}_3\text{O}^+] + K_a}$$

$$[\text{H}_3\text{O}^+]^2 + K_a [\text{H}_3\text{O}^+] - cK_a = 0 \rightarrow [\text{H}_3\text{O}^+] = \frac{-K_a}{2} + \sqrt{\frac{K_a^2}{4} + cK_a} \approx 8,43 \times 10^{-3} \text{ M}$$

$$cK_a = 0,10 \times 7,1 \times 10^{-4} = 3,55 \times 10^{-5}$$

$$\frac{K_a^2}{4} = 0,25 \times (7,1 \times 10^{-4})^2 = 1,26 \times 10^{-7}$$

$$\text{pH} = 2,07 \approx 2,1$$