Soluzione degli esercizi della Prova Scritta del 10/9/2024 - BGER, AA 2023-24

E1) Considero 100 g di sostanza $Na_xP_yO_z$ + Avro:

34,56 g	Na	$\xrightarrow{(g)}$ 34,56/22,99 = 1,50 mol	1,50/0,75 = 2	4
23,32 g	P	$\longrightarrow$ 23,32 g/30,97 g/mol = 0,75 mol	0,75/0,75 = 1	2
42,12 g	O	$\rightarrow$ 42,12 g/16,00 g/mol = 2,63 mol	2,63/0,75 = 3,5	7

$\times 2 \rightarrow$

$\rightarrow Na_4P_2O_7$ (formula minima)

E2)

$$Cu \rightarrow Cu^{2+} + 2e^- \quad | \times 3$$
$$N^{+5} + 3e^- \rightarrow N^{+2} \quad | \times 2$$
$$3Cu + 2N^{+5} \rightarrow 3Cu^{2+} + 2N^{+2}$$

$$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$$

3 : 8

$2N^{+2}$

$(2+6)N^{+5}$ $\quad 6N^{+5}$

$$n_{Cu} = \frac{0,500\ g}{63,55\ g/mol} = 7,87 \cdot 10^{-3}\ mol \quad ; \quad n_{HNO_3} = \frac{8}{3} n_{Cu} = \frac{8}{3} \cdot 7,87 \cdot 10^{-3}\ mol =$$

$$= 0,0210\ mol$$

$$V = \frac{n(mol)}{C(mol/l)} = \frac{0,0210\ mol}{1,11\ mol/l} = 0,019\ l = \underline{19\ ml}$$

E3) $C_6H_{12}O_6 \longrightarrow$ non elettrolita ($\alpha = 0$) $\longrightarrow t_{eb_{AB}} = t_{eb_A} + K_{eb} \cdot m$

Per ricavare m, considero 1 l di soluzione.

1 l $\begin{cases} m_{AB} = d \cdot V = 1,058\ g/ml \cdot 10^3\ ml = 1058\ g \\ m_B = 0,88\ mol \times 180,16\ g/mol = 158,54\ g \end{cases}$ $\quad m_A(\text{in 1 l}_{AB}) = (1058 - 158,54)\ g$

$$= 899,46\ g = 0,8995\ kg$$

$$t_{eb_{AB}} = 100 + 0,502 \cdot 0,8995 = 100,45\ ^\circ C \cong 100,5\ ^\circ C$$