

# Gabarito: Oxidação e Redução

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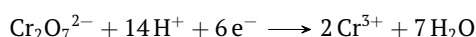


## Problemas

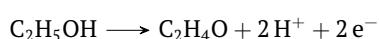
### PROBLEMA 1. C

3G01

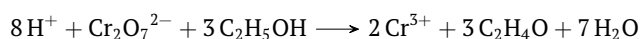
1. Reação de redução:



Reação de oxidação:



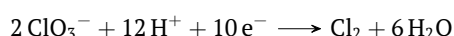
Reação global:



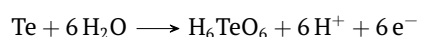
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 8 + 1 + 3 + 2 + 3 + 7 \Rightarrow S = 24$$

2. Reação de redução:



Reação de oxidação:



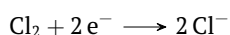
Reação global:



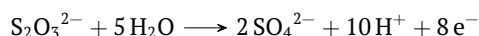
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 12 + 6 + 5 + 6 + 5 + 3 \Rightarrow S = 37$$

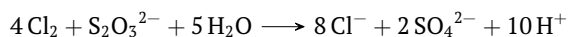
3. Reação de redução:



Reação de oxidação:



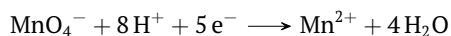
Reação global:



Soma dos menores coeficientes estequiométricos inteiros:

$$S = 4 + 1 + 5 + 8 + 2 + 10 \Rightarrow S = 30$$

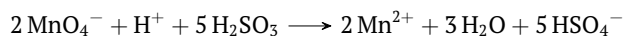
4. Reação de redução:



Reação de oxidação:



Reação global:



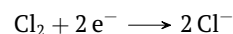
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 1 + 5 + 2 + 3 + 5 \Rightarrow S = 18$$

### PROBLEMA 2. B

3G02

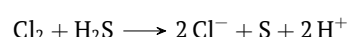
1. Reação de redução:



Reação de oxidação:



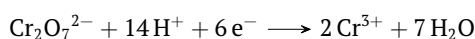
Reação global:



Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 1 + 2 + 1 + 2 \Rightarrow S = 7$$

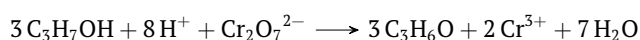
2. Reação de redução:



Reação de oxidação:



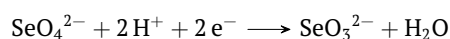
Reação global:



Soma dos menores coeficientes estequiométricos inteiros:

$$S = 3 + 8 + 1 + 3 + 2 + 7 \Rightarrow S = 24$$

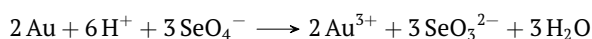
3. Reação de redução:



Reação de oxidação:



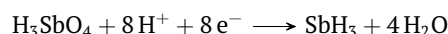
Reação global:



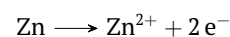
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 6 + 3 + 2 + 3 + 3 \Rightarrow S = 19$$

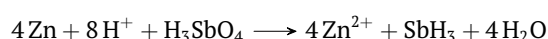
4. Reação de redução:



Reação de oxidação:



Reação global:



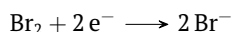
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 4 + 8 + 1 + 4 + 1 + 4 \Rightarrow S = 22$$

**PROBLEMA 3. D**

3G03

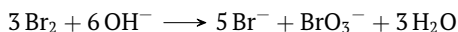
1. Reação de redução:



Reação de oxidação:



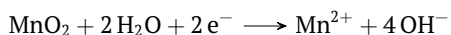
Reação global:



Soma dos menores coeficientes estequiométricos inteiros:

$$S = 3 + 6 + 5 + 1 + 3 \implies S = 18$$

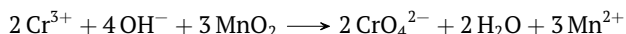
2. Reação de redução:



Reação de oxidação:



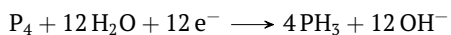
Reação global:



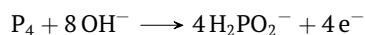
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 4 + 3 + 2 + 2 + 3 \implies S = 16$$

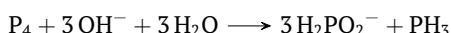
3. Reação de redução:



Reação de oxidação:



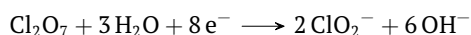
Reação global:



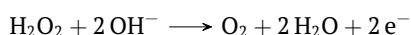
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 3 + 3 + 3 + 1 \implies S = 11$$

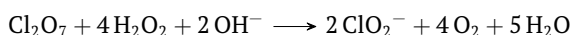
4. Reação de redução:



Reação de oxidação:



Reação global:



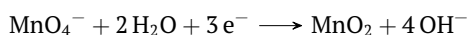
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 4 + 2 + 2 + 4 + 5 \implies S = 18$$

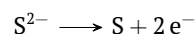
**PROBLEMA 4. D**

3G04

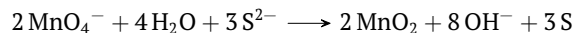
1. Reação de redução:



Reação de oxidação:



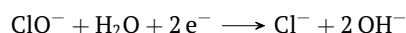
Reação global:



Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 4 + 3 + 2 + 8 + 3 \implies S = 22$$

2. Reação de redução:



Reação de oxidação:



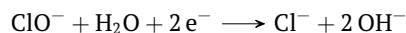
Reação global:



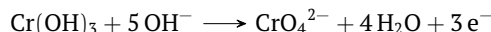
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 1 + 1 + 1 + 1 + 2 \implies S = 7$$

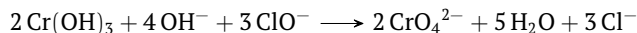
3. Reação de redução:



Reação de oxidação:



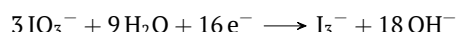
Reação global:



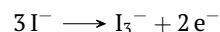
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 4 + 3 + 2 + 5 + 3 \implies S = 19$$

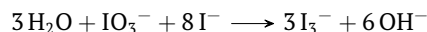
4. Reação de redução:



Reação de oxidação:



Reação global:



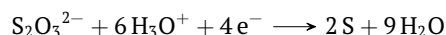
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 3 + 1 + 8 + 3 + 6 \implies S = 21$$

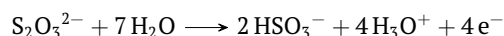
**PROBLEMA 5. A**

3G05

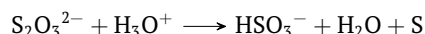
Reação de redução:



Reação de oxidação:



Reação global:



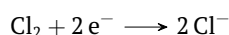
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 1 + 1 + 1 + 1 \implies S = 5$$

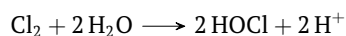
**PROBLEMA 6. A**

3G06

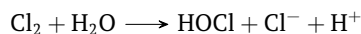
Reação de redução:



Reação de oxidação:



Reação global:



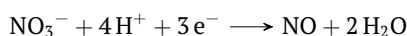
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 1 + 1 + 1 + 1 + 1 \Rightarrow S = 5$$

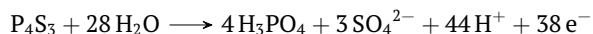
**PROBLEMA 7. A**

3G07

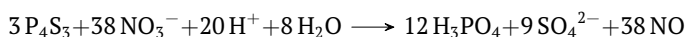
Reação de redução:



Reação de oxidação:



Reação global:



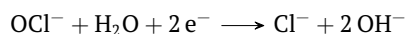
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 3 + 38 + 20 + 8 + 12 + 9 + 38 \Rightarrow S = 128$$

**PROBLEMA 8. C**

3G08

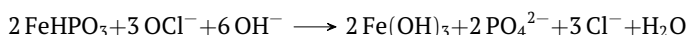
Reação de redução:



Reação de oxidação:



Reação global:



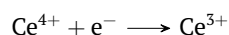
Soma dos menores coeficientes estequiométricos inteiros:

$$S = 2 + 3 + 6 + 2 + 2 + 3 + 1 \Rightarrow S = 19$$

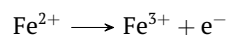
**PROBLEMA 9. C**

3G09

Reação de redução:



Reação de oxidação:



Logo,

$$n_{\text{Fe}^{2+}} = n_{\text{Ce}^{4+}} \Rightarrow$$

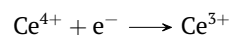
$$\Rightarrow 100\text{ mL } [\text{Fe}^{2+}] = 25\text{ mL } 0,1\text{ mol} \cdot \text{L}^{-1}$$

$$\Rightarrow [\text{Fe}^{2+}] = 25\text{ mmol} \cdot \text{L}^{-1}$$

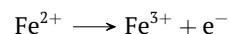
**PROBLEMA 10. A**

3G10

Reação de redução:



Reação de oxidação:



Logo,

$$n_{\text{Fe}^{2+}} = n_{\text{Ce}^{4+}} \Rightarrow$$

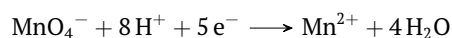
$$\Rightarrow n_{\text{Fe}^{2+}} = 13,45\text{ mL } 1,34\text{ mol} \cdot \text{L}^{-1} \Rightarrow n_{\text{Fe}^{2+}} = 18,023\text{ mmol} \Rightarrow$$

$$= \frac{18,023\text{ mmol } 56\text{ g} \cdot \text{mol}^{-1}}{20,75\text{ g}} \approx 4,864\%$$

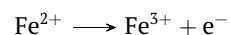
**PROBLEMA 11. B**

3G11

Reação de redução:



Reação de oxidação:



Logo,

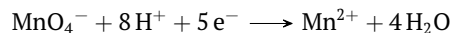
$$\frac{n_{\text{Fe}^{2+}}}{5} = n_{\text{MnO}_4^-} \Rightarrow$$

$$\Rightarrow \frac{100\text{ mL } [\text{Fe}^{2+}]}{5} = 10\text{ mL } 0,1\text{ mol} \cdot \text{L}^{-1} \Rightarrow [\text{Fe}^{2+}] = 50\text{ mmol} \cdot \text{L}^{-1}$$

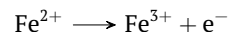
**PROBLEMA 12. D**

3G12

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{Fe}^{2+}}}{5} = n_{\text{MnO}_4^-} \Rightarrow$$

$$\Rightarrow \frac{n_{\text{Fe}^{2+}}}{5} = 40\text{ mL } 0,02\text{ mol} \cdot \text{L}^{-1} \Rightarrow n_{\text{Fe}^{2+}} = 4\text{ mmol}$$

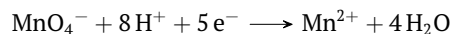
$$\Rightarrow n_{\text{Fe}_2\text{O}_3} = 2\text{ mmol}$$

$$= \frac{2\text{ mmol } 160\text{ g} \cdot \text{mol}^{-1}}{0,8\text{ g}} = 40\%$$

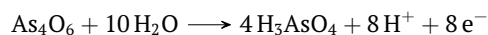
**PROBLEMA 13. C**

3G13

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{As}_4\text{O}_6}}{5} = \frac{n_{\text{MnO}_4^-}}{8} \Rightarrow$$

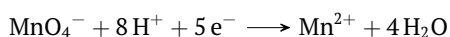
$$\Rightarrow n_{\text{As}_4\text{O}_6} = 5 \cdot \frac{28\text{ mL } 0,01\text{ mol} \cdot \text{L}^{-1}}{8} \Rightarrow n_{\text{As}_4\text{O}_6} = 0,175\text{ mmol}$$

$$m_{\text{As}_4\text{O}_6} = 0,175\text{ mmol } 396\text{ g} \cdot \text{mol}^{-1} = 69,3\text{ mg}$$

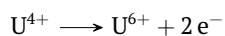
**PROBLEMA 14. C**

3G14

Reação de redução:



Reação de oxidação:



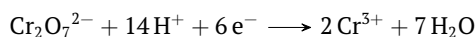
Logo,

$$\begin{aligned} \frac{n_{\text{U}^{4+}}}{5} &= \frac{n_{\text{MnO}_4^-}}{2} \Rightarrow \\ \Rightarrow \frac{n_{\text{U}^{4+}}}{5} &= \frac{25,8 \text{ ml } 0,54 \text{ mol} \cdot \text{L}^{-1}}{2} \Rightarrow n_{\text{U}^{4+}} = 34,83 \text{ mmol} \\ &= \frac{34,83 \text{ mmol } 238 \text{ g} \cdot \text{mol}^{-1}}{11 \text{ g}} \approx 75,36\% \end{aligned}$$

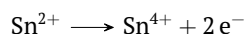
**PROBLEMA 15. C**

3G15

Reação de redução:



Reação de oxidação:



Logo,

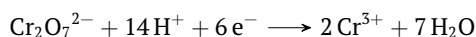
$$\begin{aligned} \frac{n_{\text{Sn}^{2+}}}{6} &= \frac{n_{\text{Cr}_2\text{O}_7^{2-}}}{2} \Rightarrow \\ \Rightarrow \frac{n_{\text{Sn}^{2+}}}{6} &= \frac{30 \text{ ml } 0,01 \text{ mol} \cdot \text{L}^{-1}}{2} \Rightarrow n_{\text{Sn}^{2+}} = 0,9 \text{ mmol} \\ &= \frac{0,9 \text{ mmol } 151 \text{ g} \cdot \text{mol}^{-1}}{0,405 \text{ g}} \approx 33,56\% \end{aligned}$$

**PROBLEMA 16. A**

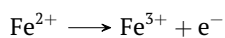
3G16

Titulação dicromato e ferro(II):

Reação de redução:



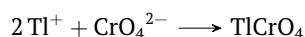
Reação de oxidação:



Logo,

$$\begin{aligned} \frac{n_{\text{Fe}^{2+}}}{6} &= \frac{n_{\text{Cr}_2\text{O}_7^{2-}}}{1} \Rightarrow \\ \Rightarrow n_{\text{Cr}_2\text{O}_7^{2-}} &= \frac{40 \text{ ml } 0,01 \text{ mol} \cdot \text{L}^{-1}}{6} \Rightarrow n_{\text{Cr}_2\text{O}_7^{2-}} \approx 0,067 \text{ mmol} \end{aligned}$$

Precipitação do cromato de tálio(I):



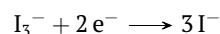
Logo,

$$\begin{aligned} \frac{n_{\text{Tl}^+}}{2} &= n_{\text{CrO}_4^{2-}} \Rightarrow \frac{n_{\text{Tl}^+}}{2} = 2 n_{\text{Cr}_2\text{O}_7^{2-}} \Rightarrow \\ n_{\text{Tl}^+} &= 4 \cdot 0,067 \text{ mmol} = 0,267 \text{ mmol} \\ m_{\text{Tl}^+} &= 0,267 \text{ mmol } 204 \text{ g} \cdot \text{mol}^{-1} = 0,0545 \text{ g} \end{aligned}$$

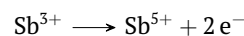
**PROBLEMA 17. D**

3G17

Reação de redução:



Reação de oxidação:



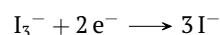
Logo,

$$\begin{aligned} \frac{n_{\text{Sb}^{3+}}}{1} &= \frac{n_{\text{I}_3^-}}{1} \Rightarrow \\ \Rightarrow \frac{n_{\text{Sb}^{3+}}}{1} &= \frac{45 \text{ ml } 0,03 \text{ mol} \cdot \text{L}^{-1}}{1} \Rightarrow n_{\text{Sb}^{3+}} = 1,35 \text{ mmol} \\ \Rightarrow n_{\text{Sb}_2\text{S}_3} &= 0,675 \text{ mmol} \\ &= \frac{0,675 \text{ mmol } 340 \text{ g} \cdot \text{mol}^{-1}}{1 \text{ g}} = 22,95\% \end{aligned}$$

**PROBLEMA 18. E**

3G18

Reação de redução:



Reação de oxidação:



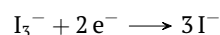
Logo,

$$\begin{aligned} \frac{n_{\text{As}^{3+}}}{1} &= \frac{n_{\text{I}_3^-}}{1} \Rightarrow \\ \Rightarrow \frac{n_{\text{As}^{3+}}}{1} &= \frac{25 \text{ ml } 0,2 \text{ mol} \cdot \text{L}^{-1}}{1} \Rightarrow n_{\text{As}^{3+}} = 5 \text{ mmol} \\ \Rightarrow n_{\text{As}_2\text{O}_3} &= 2,5 \text{ mmol} \\ &= \frac{2,5 \text{ mmol } 198 \text{ g} \cdot \text{mol}^{-1}}{8 \text{ g}} = 6,1875\% \end{aligned}$$

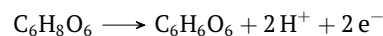
**PROBLEMA 19. C**

3G19

Reação de redução:



Reação de oxidação:



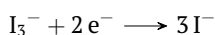
Logo,

$$\begin{aligned} \frac{n_{\text{C}_6\text{H}_8\text{O}_6}}{1} &= \frac{n_{\text{I}_3^-}}{1} \Rightarrow \\ \Rightarrow \frac{10 \text{ ml } [\text{C}_6\text{H}_8\text{O}_6]}{1} &= \frac{10 \text{ ml } 0,05 \text{ mol} \cdot \text{L}^{-1}}{1} \\ \Rightarrow [\text{C}_6\text{H}_8\text{O}_6] &= 0,05 \text{ mol} \cdot \text{L}^{-1} \\ &= \frac{0,05 \text{ mol} \cdot \text{L}^{-1} \cdot 0,1 \text{ L } 176 \text{ g} \cdot \text{mol}^{-1}}{1 \text{ g}} = 88\% \end{aligned}$$

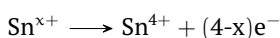
**PROBLEMA 20. C**

3G20

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{Sn}^{x+}}}{2} = \frac{n_{\text{I}_3^-}}{4-x} \Rightarrow$$

$$\Rightarrow \frac{n_{\text{Sn}^{x+}}}{2} = \frac{30\text{ ml } 0,12\text{ mol} \cdot \text{L}^{-1}}{4-x} \Rightarrow n_{\text{Sn}^{x+}} = \frac{7,2}{4-x} \text{ mmol}$$

Mas,

$$n_{\text{Sn}^{x+}} = \frac{19\text{ g} \cdot \text{L}^{-1} \cdot 0,025\text{ L}}{119\text{ g} \cdot \text{mol}^{-1} + x \cdot 35,5\text{ g} \cdot \text{mol}^{-1}} = \frac{475}{119 + 35,5x} \text{ mmol}$$

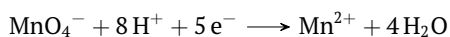
Igualando:

$$856,8 + 255,6x = 1900 - 475x \Rightarrow x \approx 1,42$$

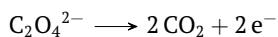
**PROBLEMA 21. C**

3G21

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{C}_2\text{O}_4^{2-}}}{5} = \frac{n_{\text{MnO}_4^-}}{2} \Rightarrow$$

$$\Rightarrow \frac{32\text{ ml } [\text{MnO}_4^-]}{2} = \frac{0,18\text{ g}}{5 \cdot 134\text{ g} \cdot \text{mol}^{-1}}$$

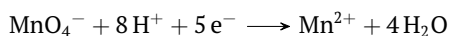
$$\Rightarrow [\text{MnO}_4^-] \approx 0,0168\text{ mol L}^{-1}$$

**PROBLEMA 22. D**

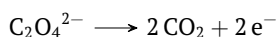
3G22

Titulação ácido oxálico e permanganato:

Reação de redução:



Reação de oxidação:

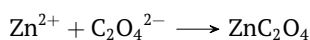


Logo,

$$\frac{n_{\text{C}_2\text{O}_4^{2-}}}{5} = \frac{n_{\text{MnO}_4^-}}{2} \Rightarrow$$

$$\Rightarrow \frac{n_{\text{C}_2\text{O}_4^{2-}}}{5} = \frac{40\text{ ml } 0,015\text{ mol} \cdot \text{L}^{-1}}{2} \Rightarrow n_{\text{C}_2\text{O}_4^{2-}} = 1,5\text{ mmol}$$

Precipitação do oxalato de zinco:



Logo,

$$n_{\text{ZnO}} = n_{(\text{NH}_4)_2\text{C}_2\text{O}_4} \Rightarrow n_{\text{ZnO}} = 1,5\text{ mmol}$$

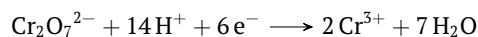
$$= \frac{1,5\text{ mmol } 81\text{ g} \cdot \text{mol}^{-1}}{0,93\text{ g}} \approx 13\%$$

**PROBLEMA 23. B**

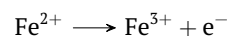
3G23

Titulação dicromato e ferro(II):

Reação de redução:



Reação de oxidação:



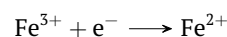
Logo,

$$\frac{n_{\text{Fe}^{2+}}}{6} = \frac{n_{\text{Cr}_2\text{O}_7^{2-}}}{1} \Rightarrow$$

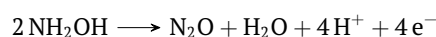
$$\Rightarrow \frac{50\text{ ml } [\text{Fe}^{2+}]}{6} = 20\text{ ml } 0,03\text{ mol} \cdot \text{L}^{-1} \Rightarrow [\text{Fe}^{2+}] = 72\text{ mmol} \cdot \text{L}^{-1}$$

Tratamento da hidroxilamina com excesso de ferro(III):

Reação de redução:



Reação de oxidação:



Logo,

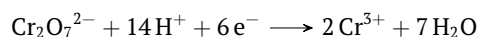
$$\frac{[\text{NH}_2\text{OH}]}{2} = \frac{[\text{Fe}^{2+}]}{4} \Rightarrow [\text{NH}_2\text{OH}] = 36\text{ mmol} \cdot \text{L}^{-1}$$

**PROBLEMA 24. A**

3G24

Titulação dicromato e urânio(IV):

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{U}^{4+}}}{6} = \frac{n_{\text{Cr}_2\text{O}_7^{2-}}}{2} \Rightarrow$$

$$\Rightarrow \frac{n_{\text{U}^{4+}}}{3} = 20\text{ mL } 0,1\text{ mol} \cdot \text{L}^{-1} \Rightarrow n_{\text{U}^{4+}} = 6\text{ mmol}$$

Precipitação do sólido:

$$\frac{n_{\text{Na}^+}}{1} = \frac{n_{\text{U}^{4+}}}{3} \Rightarrow n_{\text{Na}^+} = 2\text{ mmol}$$

$$\Rightarrow n_{\text{NaCl}} = 2\text{ mmol} \frac{500\text{ mL}}{25\text{ mL}} = 40\text{ mmol}$$

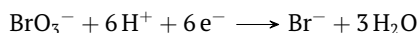
$$= \frac{40\text{ mmol } 58,5\text{ g} \cdot \text{mol}^{-1}}{3\text{ g}} = 78\%$$

**PROBLEMA 25. A**

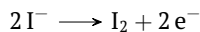
3G25

Tratamento do bromato com iodeto:

Reação de redução:



Reação de oxidação:

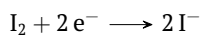


Logo,

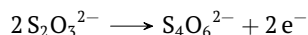
$$\frac{n_{\text{BrO}_3^-}}{2} = \frac{n_{\text{I}_2}}{6} \Rightarrow \Rightarrow \frac{n_{\text{I}_2}}{3} = \frac{0,1\text{ g}}{167\text{ g} \cdot \text{mol}^{-1}} \Rightarrow n_{\text{I}_2} \approx 1,8\text{ mmol}$$

Titulação do iodo com tiosulfato de sódio:

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{S}_2\text{O}_3^{2-}}}{2} = \frac{n_{\text{I}_2}}{1} \Rightarrow$$

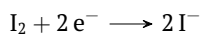
$$40\text{ mL } [\text{S}_2\text{O}_3^{2-}] = 3,6\text{ mmol} \Rightarrow [\text{S}_2\text{O}_3^{2-}] = 90\text{ mmol} \cdot \text{L}^{-1}$$

**PROBLEMA 26. A**

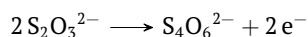
3G26

Titulação do iodo com tiosulfato de sódio:

Reação de redução:



Reação de oxidação:



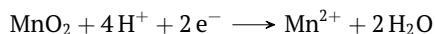
Logo,

$$\frac{n_{\text{S}_2\text{O}_3^{2-}}}{2} = \frac{n_{\text{I}_2}}{1} \Rightarrow$$

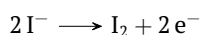
$$\Rightarrow \frac{n_{\text{I}_2}}{1} = \frac{1}{2} \cdot 30\text{ mL } 0,08\text{ mol} \cdot \text{L}^{-1} \Rightarrow n_{\text{I}_2} = 1,2\text{ mmol}$$

Titulação do dióxido de manganês com iodeto:

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{MnO}_2}}{1} = \frac{n_{\text{I}_2}}{1} \Rightarrow n_{\text{MnO}_2} = 1,2\text{ mmol}$$

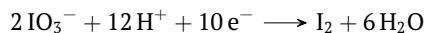
$$= \frac{2,4\text{ mmol } 87\text{ g} \cdot \text{mol}^{-1}}{0,16\text{ g}} = 65,25\%$$

**PROBLEMA 27. A**

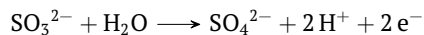
3G27

Titulação do sulfito com iodato de potássio:

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{SO}_3^{2-}}}{5} = \frac{n_{\text{IO}_3^-}}{2} \Rightarrow \Rightarrow \frac{n_{\text{SO}_3^{2-}}}{5} = \frac{1}{2} \cdot 5\text{ mL } 0,003\text{ mol} \cdot \text{L}^{-1} \Rightarrow n_{\text{SO}_3^{2-}} = 3,75 \times 10^{-5}\text{ mol}$$

$$m_{\text{SO}_2} = 3,75 \times 10^{-5}\text{ mol} \cdot 64\text{ g mol}^{-1} = 2,4\text{ mg}$$

Cálculo da massa de gás:

$$m_{\text{gas}} = 1,2\text{ g L}^{-1} \cdot 2,5\text{ L min}^{-1} \cdot 60\text{ min} = 180\text{ g}$$

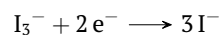
$$\chi = \frac{2,4 \times 10^{-3}}{180} \approx 13,34\text{ ppm}$$

**PROBLEMA 28. C**

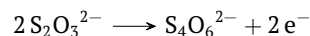
3G28

Titulação do triiodeto com o tiosulfato de sódio:

Reação de redução:



Reação de oxidação:



Logo,

$$\frac{n_{\text{S}_2\text{O}_3^{2-}}}{2} = \frac{n_{\text{I}_3^-}}{1} \Rightarrow$$

$$n_{\text{I}_3^-} = \frac{1}{2} \cdot 8\text{ mL} \cdot 0,002\text{ mol L}^{-1} \Rightarrow n_{\text{I}_3^-} = 8 \times 10^{-6}\text{ mol}$$

Conversão do monóxido em dióxido de carbono:



Logo,

$$\frac{n_{\text{CO}}}{5} = n_{\text{I}_2} = \frac{1}{2} n_{\text{KI}} = \frac{3}{2} n_{\text{I}_3^-} \Rightarrow n_{\text{CO}} = \frac{15}{2} n_{\text{I}_3^-}$$

$$m_{\text{CO}} = \frac{15}{2} \cdot 8 \times 10^{-6}\text{ mol} \cdot 28\text{ g mol}^{-1} = 1,68\text{ mg}$$

Cálculo da massa de ar:

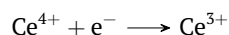
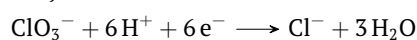
$$m_{\text{ar}} = \frac{1\text{ atm} \cdot 25\text{ L}}{298\text{ K} \cdot 0,082\frac{\text{atm L}}{\text{mol K}}} \cdot 28,8\text{ g mol}^{-1} \approx 29,47\text{ g}$$

$$\chi = \frac{1,68 \times 10^{-3}}{29,47} \approx 57\text{ ppm}$$

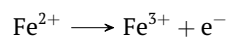
**PROBLEMA 29. C**

3G29

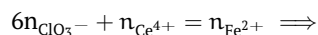
Reações de redução:



Reação de oxidação:



Logo,



$$6n_{\text{ClO}_3^-} + 20\text{ mL} \cdot 0,1\text{ mol L}^{-1} = 50\text{ mL} \cdot 0,1\text{ mol L}^{-1}$$

$$\implies n_{\text{ClO}_3^-} = 0,5\text{ mmol}$$

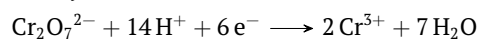
$$m_{\text{KClO}_3} = 0,5\text{ mmol} \cdot 122,5\text{ g mol}^{-1} = 61,25\text{ mg}$$

$$\chi = \frac{61,25}{125} = 49\%$$

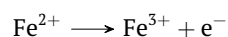
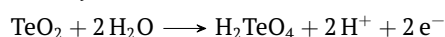
**PROBLEMA 30. E**

3G30

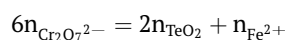
Reação de redução:



Reações de oxidação:



Logo,



$$650\text{ mL} \cdot 0,03\text{ mol L}^{-1} = 2n_{\text{TeO}_2} + 10\text{ mL} \cdot 0,1\text{ mol L}^{-1}$$

$$\implies n_{\text{TeO}_2} = 4\text{ mmol}$$

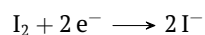
$$m_{\text{TeO}_2} = 4\text{ mmol} \cdot 159,5\text{ g mol}^{-1} = 638\text{ mg}$$

$$\chi = \frac{0,638}{2} = 31,9\%$$

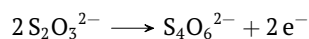
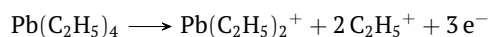
**PROBLEMA 31. A**

3G31

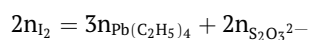
Reação de redução:



Reações de oxidação:



Logo,



$$2 \cdot 15\text{ mL} \cdot 0,02\text{ mol L}^{-1} = 3n_{\text{Pb}(\text{C}_2\text{H}_5)_4} + 2 \cdot 6\text{ mL} \cdot 0,04\text{ mol L}^{-1}$$

$$\implies n_{\text{Pb}(\text{C}_2\text{H}_5)_4} = 0,12\text{ mmol}$$

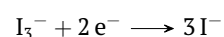
$$m_{\text{Pb}(\text{C}_2\text{H}_5)_4} = 0,12\text{ mmol} \cdot 323\text{ g mol}^{-1} = 38,76\text{ mg}$$

$$C = \frac{0,3876\text{ g}}{0,025\text{ mL}} = 1,5504\text{ g L}^{-1}$$

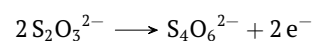
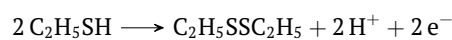
**PROBLEMA 32. D**

3G32

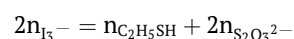
Reação de redução:



Reações de oxidação:



Logo,



$$250\text{ mL} \times 0,01\text{ mol L}^{-1} = n_{\text{C}_2\text{H}_5\text{SH}} + 2 \cdot 15\text{ mL} \cdot 0,01\text{ mol L}^{-1}$$

$$\implies n_{\text{C}_2\text{H}_5\text{SH}} = 0,7\text{ mmol}$$

$$m_{\text{C}_2\text{H}_5\text{SH}} = 0,7\text{ mmol} \times 62\text{ g mol}^{-1} = 43,4\text{ mg}$$

$$\chi = \frac{0,0434\text{ g}}{2,17\text{ g}} = 2\%$$