

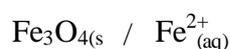
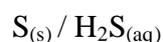
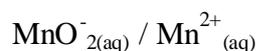
DIRECTED WORK N°3**Exercice1 :**

Determine the oxidation number of chromium in $\text{Cr}_2\text{O}_7^{2-}$ and Cr^{+3} ?

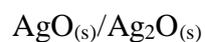
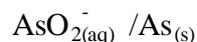
Which of the two species is the oxidizing and which the reducing agent? Justify your answer.

Exercice2 :

Write down the half - equations of the following **ox/red** pairs in **acid medium**:

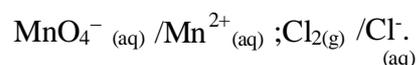
**Exercice3 :**

Write down the half-equations of the following **ox/red** pairs in a **basic medium**:

**Exercice4 :**

A solution of potassium permanganate reacts with a solution A containing chloride ions Cl^- . The result is chlorine gas Cl_2 .

a- According to the oxidizing/reducing pairs given below, write the half-equations corresponding to these pairs?



b- Deduce the overall equation for the chemical transformation.

c- What is the volume of chlorine that can be prepared from 10g of solid potassium permanganate. The acid will be used in excess.

Data: Molar volume under experimental conditions $V_m = 25 \text{ L} \cdot \text{mol}^{-1}$. $K = 39,1 \text{ g} \cdot \text{mol}^{-1}$

$\text{Mn} = 54,9 \text{ g} \cdot \text{mol}^{-1}$, $\text{O} = 16 \text{ g} \cdot \text{mol}^{-1}$.

Exercice5 :

Either the battery : $\text{Fe}/\text{Fe}^{2+}/\text{Sn}^{2+}/\text{Sn}$

- a- What are the positive and negative poles of this battery?
- b- Write down the half-reactions at the electrodes and the balance equation?
- c- What are the final concentrations of Fe^{2+} and Sn^{2+} ions if each half-stack initially contains 50 mL of 0.1 M solution and the mass of iron has decreased by 28 mg?

Data : $E^\circ(\text{Fe}^{2+}/\text{Fe}) = -0,44\text{V}$; $E^\circ(\text{Sn}^{2+}/\text{Sn}) = -0,136\text{ V}$.

Exercice6:

A **button** battery contains 1.85g silver oxide.

- a- Write down the oxidation and reduction reactions between the pairs $\text{Ag}_2\text{O}/\text{Ag}$ ($E^\circ=0,34\text{ V}$) and $\text{Zn}(\text{OH})_4^{2-}/\text{Zn}$ ($E^\circ = -1,20\text{ V}$).
- b- What is the voltage (ΔE) supplied by the battery?
- c- What is the mass of Zn that disappears during battery operation?

Exercice7:

We consider the following battery : $\text{Cu}/\text{Cu}^{2+}(0,1\text{M})//\text{Fe}^{3+}(0,4\text{M}),\text{Fe}^{2+}(0,4\text{M})/\text{Pt}$

- a- Determine the potential of each of the electrodes and deduce their polarities?
Calculate the **e.m.f.** of the battery?
- b- Draw a diagram of this cell, specifying the direction of the electric current and the direction of ion migration in the salt bridge, which is a solution of KCl. Give the redox half-reactions that take place at each electrode.
- c- Write down the overall reaction. Calculate the equilibrium constant.
- d- After a period of operation, the potential of the Cu(s) electrode becomes equal to 0.32V. Calculate the concentration of Cu^{2+} ions under these conditions.

Data: $E^\circ(\text{Cu}^{2+}/\text{Cu}(\text{s})) = 0,34\text{V}$; $E^\circ(\text{Fe}^{3+}/\text{Fe}^{2+}) = 0,77\text{ V}$.

