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Serie No. 3

Exercice 1

1) Write the ionic and molecular redox reactions between iron (II) ions (Fe^{2+} and permanganate ions (MnO_4^-) in an acidic medium.
2) Write the ionic and molecular equation for the reaction

$MnO_4^- + C_2O_4^{2-} \rightarrow CO_2 + MnO_2$ (acidic medium)

3) Write the ionic and molecular equation for the reaction

$N_2H_4 + Cr_2O_7^{2-} \rightarrow N_2 + Cr^{3+}$

Exercice 2

A zinc strip is immersed in 100 mL of a silver nitrate ($AgNO_3$) solution with a concentration of C = 0.2 mol/L.

1. What are the redox couples involved in this experiment ?
2. Write the equation of the reaction that occurs.

Given that zinc is in excess, determine the mass of silver deposited at the end of the reaction.

1) What mass of zinc has disappeared ?

Atomic molar masses : Ag = 108 g/mol ; Zn = 65.4 g/mol.

Exercice 3

1. **Write the oxidation and reduction reactions occurring at the electrodes of the Daniell cell.**
2. **Calculate the electromotive force (f.e.m.) of the Daniell cell.**
3. **Calculate the total amount of electricity Q delivered by the cell over the 2 hours of operation.**

We give

- The standard electrode potential of the zinc half-cell (Zn^{2+}/Zn) is $E_{Zn} = -0.76\,V$.
- The standard electrode potential of the copper half-cell (Cu^{2+}/Cu) is $E_{Cu} = +0.34\,V$.
- The current flowing through the circuit is measured to be **0.5 A**.

Exercice 4

Determine the Equilibrium Constant for the Redox Reaction:

$$Fe^{3+} + Cu \rightleftharpoons Fe^{2+} + Cu^{2+}$$

$E^\circ_{Fe^{3+}/Fe^{2+}} = +0.77\,V,$
$E^\circ_{Cu^{2+}/Cu} = +0.34\,V.$