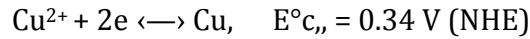


**ASIGNATURAS: FISICOQUÍMICA DE IÓNICA Y ELECTRÓDICA (1401),
ELECTROQUÍMICA (1540)
DEPARTAMENTO: FISICOQUÍMICA. FACULTAD QUÍMICA. UNAM
SERIE ECUACION DE NERNST**

1. Two half cell reactions are given below:



Their reduction potentials are given opposite to each reaction. Calculate:

- a) the emf of the cell, and
 - b) show the spontaneous cell reaction.
2. Calculate the reversible potential for a zinc electrode in contact with ZnCl_2 when the activity of zinc is $a_{\text{Zn}^{2+}} = 10^{-3}$. Use IUPAC Convention.

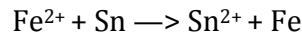
3. Show that for the reduction reaction: $2 \text{H}^+ + 2e \rightleftharpoons \text{H}_2$

$$E_{\text{H}} = -0.059 \text{ pH}$$

4. Show that for the reaction: $\text{O}_2 + 2\text{H}_2\text{O} + 4e \rightleftharpoons 4 \text{OH}^-$

$$E(\text{O}_2/\text{OH}^-) = E^{\circ}(\text{O}_2/\text{OH}^-) - 0.059 \log a_{\text{OH}^-}$$

5. Calculate the potential of oxygen electrode at $\text{pH} = 14$.
6. In the cell reaction given below, what is the ratio of the activity of ionic species required to make the polarity reverse?



7. The emf of a cell made of Zn (anode) and H_2 electrode (cathode) immersed in 0.7 M ZnCl_2 is +0.690 V. What is the pH of the solution? (For $[\text{Zn}^{2+}] = 0.7 \text{ M}$, activity coefficient, $\gamma_{\pm} = 0.6133$)
8. Calculate the theoretical tendency of nickel to corrode in deaerated water of $\text{pH} = 8$. Assume the corrosion products are H_2 and $\text{Ni}(\text{OH})_2$ and the solubility product, K_{sp} is 1.6×10^{-16} ($E^{\circ}_{\text{Ni}} = -0.25 \text{ V vs NHE}$).
9. Calculate the pressure of H_2 required to stop corrosion of iron immersed in 0.1 M FeCl_2 , $\text{pH} = 4$. (For $[\text{Fe}^{2+}] = 0.1 \text{ M}$, activity coefficient, $\gamma_{\pm} = 0.75$).
10. Calculate if silver would corrode when immersed in 0.5 M CuCl_2 to form solid AgCl . What is the corrosion tendency? $E^{\circ}_{\text{AgCl}} = 0.22$