1.
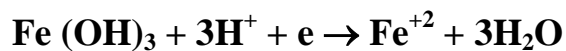
    a) **Write what you know about :**

- **Electrochemical type of corrosion**
- **Uniform attack of corrosion**
- **Hydrogen evolution corrosion**
- **Mechanism of altar – pure metals corrosion**

    b) **Discuss the potential – PH diagrams with the special reference to Fe - H_2O system**

    c) **Calculate E^0 and PH at the equilibrium for the reaction:**

$$Fe\,(OH)_3 + 3H^+ + e \rightarrow Fe^{+2} + 3H_2O$$

    d) **The standard chemical potentials for the involved species in (kJ) are:**

$Fe\,(OH)_3$= -694 ; Fe^{+2} = -85 ; $3H_2O$ = -237 and H+ = 0.0 , Use (F) in coulomb = 96500 .

2. **Discuss the kinetic theory of the corrosion for industrial metals. Confirm that by the calculation of i_{corr} of a piece of Zn containing 5% Fe at PH = 2.0, where:**

$\eta = -1.24 - 0.12 \log i_{H\,(Zn)}$

$\eta = -0.7 - 0.12 \log i_{H\,(Fe)}$

    a) **diagrams of Evans**

    b) **the relation between the corrosion rate of metals and PH of the used solution .**

Good Luck : Dr. Sanaa Arab