

Misurata University

Faculty of Engineering - Department of Petroleum Engineering

Corrosion in Oil Industry – Final Exam

Answer only 5 questions

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Time allowed:2hr:30min

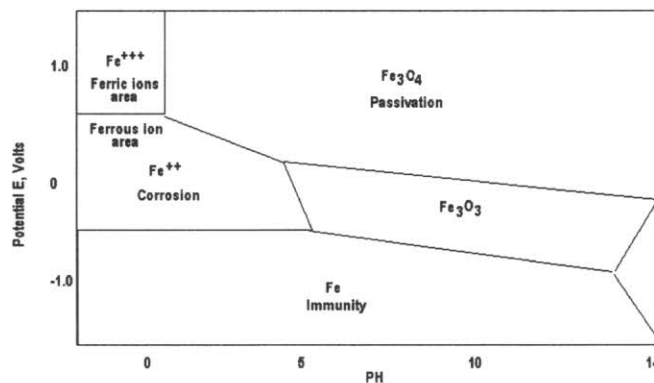
Q1:

1. Define clearly the following terms: Corrosion – Electrode – Anode – Cathode – Partial reactions – rate of corrosion.
2. Show how different approaches and methods can be used to minimize the corrosion of engineering structures.

Q2

1. Draw a galvanic cell and explain with aid of chemical reactions how normally corrosion takes place in such cell.
2. In a galvanic cell Chromium with PE = +0.74V was corroded by copper with – 0.337V giving 3 positive ions. Estimate the PE of the cell E_{cell} . and hence calculate the total free energy ΔG .

Q3: With aid of the following chart explain how corrosion rate could be governed by both PE and PH and comment on the PE/PH combination for the five different shown regions.



Q4: Steel corrodes in air electrochemically, it is found that electrical current density = $6.5\mu A/cm^2$. Corrosion rate was found to be due to ferric ions. Calculate corrosion rate in MPY given density of iron is $7.86 gm/cm^3$ and atomic mass of iron is 55.8 amu.

Q5: Write short accounts about corrosion in oil industry that may takes place in different manner and locations, showing reasons and methods of protection for each case.

Q6: give short notes to show how pitting, crevice, hydrogen damage, stress cracking, selective and erosion corrosion take place.

Good Luck