

B Met Engg 3rd Year. 1st Semester Supplementary Exam 2017**SUBJECT: ELECTROCHEMISTRY AND CORROSION**Time : Three hoursFull Marks 100Answer any five questions

1. Draw a polarization diagram with labeling and all reactions for corrosion of steel in aqueous environment and explain Activation polarization, Concentration polarization, Describe how to determine corrosion rate by Tafel Extrapolation and Linear polarization 20

2. Distinguish the following in tabular form 5+7+4+4

i. Crevice Corrosion and Pitting corrosion ii. SCC and HIC iv. Inter granular corrosion and Selective leaching
V Erosion Corrosion and Cavitations Damage

3.a Explain how the parameters of i. Humidity, ii. Pollutants iii. Temperature, iv. wind flow affect the atmospheric corrosion of steel structure. Why Cu steel and HSLA steel has better corrosion resistance in atmosphere than plain carbon steel? 8

3b. What is the difference between Aqueous Oxidation and Dry Oxidation? Explain how oxidation of metal, at high temperature, proceeds with formation of n and p-type oxides. Describe with neat sketches the effects of doping with lower and higher valent elements in p and n type oxides 3+9

4. Discuss the following methods of corrosion protection

a. Cathodic Protection b. Anodic Protection c. Inhibitor d. Organic Coatings

5. Draw polarization diagrams on the followings 5 X4

- A steel is getting corroded in acid and Zn is attached to the steel
- Corrosion of a stainless steel condenser pipe containing flow of hot water and now a passivator is added.
- Compare corrosion of the submersed pipe surface at different depths as well as sea bed.
- A stainless steel tank containing conc. Sulphuric acid is getting corroded and now anodic protection is applied

6. Explain the followings 4+5+6 +5

a. Nernst equation b. Corrosion Fatigue c. E-Ph diagram of Iron d. Fuel Cell

7. Write short notes on 6+6+4+4

- Distinction between Electroplating and Anodizing b. Passivity, Cyclic polarization, E_p and E_{pp}
- Inter granular Corrosion and Weld decay d. Exchange current density and limiting current density