

**III B.Tech II Semester Supplementary Examinations, April/May 2005**  
**CORROSION ENGINEERING**  
**(Chemical Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Discuss, in detail, about emf series and galvanic series.  
(b) Explain the effect of different environmental variable on corrosion.
2. (a) Explain why?
  - i. Iron can be passivated in water only when it flows at a high rate?
  - ii. It is not always robe to couple metals together in electromotive series?
  - iii. Buried Ferrous Pipelines buried in wet carbonaceous back fill have a short life?
  - iv. Chronics alloying with iron promoter corrosive resistance to the result at alloy?  
(b) Show that when applied current density approaches the limiting current density the over potential at the cathode increases rapidly where as over potential at the anode remains very small.
3. (a) Give a detailed account of prevention of galvanic corrosion.  
(b) Discuss in detail with suitable illustrations, the beneficial applications of galvanic corrosion.
4. (a) Indicate the characteristic property for the following parameters towards SCC shown by an alloy :
  - i. Temperature increase
  - ii. Crack morphology
  - iii. Presence or absence of corrosion product in the crack
  - iv. Crack surface appearance
  - v. Stress level -  
(b) Schematically represent the effect of simultaneous tensile stress, susceptible metallurgical condition , and critical corrosive solution required for stress corrosion cracking.  
(c) Discuss graphically rate of SCC propagation as a function of crack depth and specimen extension as a function of time during constant-load stress-corrosion cracking test
5. (a) Whether weight-loss measurement is useful in polymer corrosion?  
(b) List all the tests used to evaluate corrosion of alloys, metals, thermoplastic and thermosetting resins.

6. (a) Discuss the need for surface preparation and various methods of surface preparation before giving organic coatings.  
(b) Discuss the use of primers and top-coats for protecting structures.
7. Write briefly on:
  - (a) exchange current density
  - (b) mixed potential theory
8. (a) Explain the effect of cathode-anode area on electrochemical corrosion of a galvanic couple of dissimilar metals.  
(b) Compare : Galvanic series with EMF series.

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