

ELECTROCHEMISTRY AND CORROSION

1. Define the following:
Electrochemical cell b) Galvanic cell c) Electrolytic cell
2. Explain the origin of electrode potential. Define emf of the cell. How is it determined?
3. Derive the Nernst equation for single electrode potential.
4. Define the following:
Single electrode potential b) standard electrode potential
5. Explain the different types of electrodes with example.
6. What are the advantages of saturated calomel electrode (SCE) over primary reference electrodes (SHE)?
7. Why is calomel electrode said to be reversible with respect to chloride ions.
8. What is electrolyte and electrode type concentration cells ?
9. Derive an expression for EMF of the electrolyte concentration cell by using Nernst equation.
10. What are ion selective electrodes? Give examples.
11. Give the construction and working of glass electrode.
12. Give the Cell representation of cell formed when glass electrode combined with external reference electrode and also explain as to how of an unknown solution can be determined using this assembly.
13. Why do the metals undergo corrosion?
14. Describe electrochemical theory of corrosion.
15. Why pitting corrosion is the most destructive form of corrosion?
16. Name the type of corrosion that may occur in the following cases and explain the corrosion process.
 - (i) Partially filled water tank made up of iron kept for a long time.
 - (ii) Ocean going ship partially immersed in sea water.
17. Name the type of corrosion that may occur in the following cases and explain the corrosion process.
 - (i) Steel pipe connected to copper plumbing
 - (ii) Lead antimony solder around copper wire
 - (iii) Paper pins inside the paper gets corroded
 - (iv) Partially buried pipe line in soil or submerged in water
18. What is stress corrosion? Give any two examples.
19. Discuss the effect of potential difference between anodic and cathodic area on the rate of corrosion.
20. Discuss the effect of pH and temperature on the rate of corrosion.

21. Discuss the following factors effect on the rate of corrosion:
 - (a) Hydrogen over voltage
 - (b) Polarization
 - (c) Temperature
22. Why anodic coatings are called as sacrificial anodic coatings?
23. What is the role of ammonium chloride in galvanization process?
24. Explain the steps involved in galvanization of an article made of iron.
25. What is sealing? Mention any two applications of anodized articles.
26. How do cathodic corrosion inhibitors prevent the liberation of hydrogen at cathode?
27. What happens when insufficient quantity of anodic inhibitors is added to the corrosion medium?
28. What is sacrificial anodic method? Mention its applications.
29. Write a note on applications of impressed current method.
30. Compare Sacrificial anodic protection method with impressed current cathodic metal.