

QUESTION BANK

Module: 5 (Sensor based Analytical Techniques)

Electrode system:

1. What are reference electrodes? Explain the construction and working of calomel electrode with diagram. How an unknown electrode potential is determined using calomel electrode? (1+5+4=10)
2. What are ion selective electrodes? Explain the construction and working of glass electrode with diagram. How an unknown solution pH is determined using glass electrode? (1+6+3=10)
3. What are concentration cells? Explain the construction of a concentration cell? Derivation of Nernst equation. One numerical problem. (1+2+4+3=10)

Sensors:

1. Define sensors. Explain the three different types of electrochemical sensors with example. (1+9=10)

Analytical Techniques:

1. What do you mean by Potentiometric sensor? Explain the working principle and instrumentation of Potentiometric sensors. (2+8=10)
2. What do you mean by Conductometric sensor? Explain the working principle and instrumentation of Conductometric sensor. (2+8=10)

Module: 2 (Corrosion science)

1. What is corrosion? Explain the Electrochemical theory of corrosion taking rusting of iron as an example. (2+8=10)
2. Write a short note of the following with diagram: (a) differential metal corrosion, (b) differential aeration corrosion, (c) waterline corrosion and (d) pitting corrosion. (4+4+4+4=16)
3. Write a short note on: (a) Sacrificial anode method, (b) Impressed current method, (c) Anodic coating or Galvanization and (d) Cathodic coating or Tinning. (4+4+4+4=16)