Applied Chemistry for CSE Steam SIMP Questions -22SCHEME

Module-1(Study any 5 Questions)

1. Define Sensor . What are electrochemical sensors? Explain the principle and working of electrochemical sensors and mention its applications.
2. Discuss the principle of the following: (a) Conductometric sensors (b) Optical sensors (c) Electrochemical gas sensors detection of SOx and NOx.
3. Explain the detection of the following: (a) Pharmaceutical pollutant diclofenac using electrochemical sensor with electro oxidation reactions. (b) Hydrocarbon pollutant 1- hydroxy pyrene using Electrochemical sensor with electro-oxidation reactions. (c) Bio-molecule ascorbic acid using disposal sensor, also write electro oxidation reaction. (d) Herbicide-Glyphosate
4. Define a battery. Give the classification of batteries with examples. What is a secondary battery? Explain the construction and working of the following: (a) Li- Ion battery (b) Na- Ion battery
5. Explain the construction and working of Quantum Dot Sensitized Solar Cell QDSSC

Module-2(Study any 5 Questions)

1. What are memory devices? Explain the classification of electronic memory devices with examples. Explain the types of organic memory devices by taking p-type and n-type semiconducting materials.
2. Define Optoelectronic device. Explain the working principle of Optoelectronic devices and also write the properties and applications of Silicon nano crystals for optoelectronic devices.
3. Discuss the following: (a) Liquid crystal display (b) Polyimide polymeric material for organic memory devices.
4. What are nanomaterials? Explain any 4 properties and applications of Polythiophenes (P3HT) suitable for optoelectronic devices.
5. Define photoactive and electroactive materials and write their working principle in the display system.
6. What is QLED? Mention any 4 properties and applications of QLED.
7. Explain the classification of liquid crystals. Discuss the working of liquid crystal display. Mention any 4 properties and applications of LCD.

Module-3(Study any 5 questions)

1. Define metallic corrosion. Describe the electrochemical theory of corrosion taking iron as an example.
2. Discuss the following types of Corrosion:
   a. Differential Metal Corrosion b. Differential aeration Corrosion
3. What is cathodic protection? Describe sacrificial anode technique and mention the advantages and disadvantages.
4. Define galvanizing. Describe galvanizing of Iron and mention its applications.
5. Explain (i)Anodizing of aluminum (ii)Concentration cell working with diagram
6. Explain the construction and working of ion selective electrodes and how it can be used for the determination of pH of a solution.
7. Briefly explain the principle, instrumentation and working of potentiometry taking estimation of Iron as example.

   Or

   Explain the principle, instrumentation and working of conductometry taking estimation of weak acid using a strong base as an example.

Module-4 (Study any 5 questions)

1. Discuss the conduction mechanism in Polyacetylene through oxidative and reductive doping technique.
2. Explain the preparation, properties, and commercial applications of (i)Kevlar (ii)Graphene oxide
3. Explain the construction and working of photovoltaic cells. Mention the advantages and disadvantages.
4. What is Green Fuel (Hydrogen fuel)? Mention the advantages of green fuel.
5. Describe the generation of hydrogen by Alkaline water electrolysis with a neat labeled diagram.
6. Explain the generation of hydrogen by proton exchange membrane electrolysis.
7. Illustrate with a neat labeled diagram the production of Hydrogen by using solid oxide electrolyzer

Module- 5

1. Define E-Waste. Explain the sources,need and composition of e-waste and Explain the importance of E-Waste management
2. Briefly discuss the various steps involved in recycling of e-waste. (all the three STEPS)
3. Explain the steps involved in extraction of gold from e-waste.
4. Explain the ill effects of toxic materials used in manufacturing electrical and electronic products.
5. Discuss the following: (i) Pyrometallurgy (ii) Hydrometallurgy
6. Write a brief note on the role of stakeholders for example; producers, consumers, recyclers, and statutory bodies.
7. Briefly explain direct recycling of e-waste.