SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
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QUESTION BANK

Subject with Code : Applied Chemistry (19HS0801) **Course & Branch**: B.Tech (**EEE,ECE)**
Year & Sem: I-B.Tech & I-Sem **Regulation:** R19

UNIT-I

ELECTROCHEMISTRY AND APPLICATIONS

1. A) What is Electrochemical cell ? Give an example. [7M]

   B) Calculate the single electrode potential of zinc in 0.05M $ZnSO_4$ solution at 25^0C.

   $E^0_{Zn/Zn^{2+}} = 0.763V$. [5M]

2. Define Electrode Potential. Derive the Nernst equation for a single electrode potential and write its applications. [12M]

3. Write short notes on
   A) Potentiometric Titrations (Redox Titrations) [5M]
   B) Hydrogen-Oxygen fuel cell . [7M]

4. Define Conductometric titrations. Discuss all types of Acid-Base Conductometric titrations and Explain the nature of the graphs between conductance and volume of titrant used. [12M]

5. Define Photovoltaic cell. Explain construction, working and applications of photovoltaic cell. [12M]

6. Define electrochemical sensor. Draw the neat sketch of electrochemical sensor and explain its construction, working principle and applications. [12M]

7. A) Write a brief note on potentiometric sensor [8M]
   B) Write short note on Glucose Potentiometric Sensor [4M]

8. A)What is primary Battery ? Write a brief note on Zinc-Air battery . [7M]
   B)Write short note on Alkali metal sulphide batteries [5M]

9. A)What is secondary Battery ? Explain the Construction and working of Lead acid battery. [7M]
   B)Write a note on Lithium Ion rechargeable cell. [5M]

10. A)What is a Fuel cell ? Describe the Construction and Working of Methanol – Oxygen Fuel cell . [7M]
    B)Wrie short note on Photo Galvanic cell [5M]

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UNIT -II
STRUCTURE AND BONDING MODELS

1. A) Explain Planck's Quantum Theory. [5M]
   B) Write a brief note on particle in one dimensional box. [7M]
2. Derive Schrodinger wave equation? Explain the significance of the Ψ and Ψ^2 . [12M]
3. A) Explain pi- molecular orbital's of Butadiene with a neat sketch. [6M]
   B) Explain pi- molecular orbital of Benzene with a neat sketch. [6M]
4. A) Write De-Broglie's equation. [6M]
   B) Explain Heisenberg Uncertainty principle. [6M]
5. Draw the molecular orbital diagrams of Oxygen molecule (O_2) and Nitrogen molecule (N_2). Explain their magnetic nature and bond order. [12M]
6. Explain the energy level diagrams of CO and NO molecule. Explain their magnetic nature and Bond order. [12M]
7. A) Explain the band theory of solids. [5M]
   B) What is doping? Explain the role of doping on band structures. [7M]
8. A) Explain the application of Ψ and Ψ^2 to hydrogen atom. [6M]
   B) Write the postulates of molecular orbital theory. [6M]
9. What is Crystal field theory? Explain the crystal field splitting in octahedral and tetrahedral Complexes. [12M]
10. Draw the band diagrams of Conductors, Semiconductors and Insulators [12M]

UNIT III
POLYMER CHEMISTRY

1. A) What is functionality of monomer? [5M]
   B) Write a note on nomenclature of polymers. [7M]
2. Explain the following mechanism with examples.
   A) Free radical addition polymerization. [6M]
   B) Cationic addition polymerization. [6M]
3. Explain the following mechanism with examples.
   A) Anionic addition polymerization. [6M]

B) Co-ordination or Ziegler-Natta polymerization. [6M]

4. Explain the following mechanism with examples.
   A) Condensation or Step growth polymerization. [6M]
   B) Co-polymerization (stereo specific polymerization). [6M]
5. Explain the mechanism of Addition polymerization. [12M]
6. A) Distinguish between Thermoplastics and thermosetting plastics. [6M]
   B) Describe the preparation, properties and uses of Bakelite. [6M]
7. A) Describe the preparation, properties and uses of Nylon-6,6. [5M]
   B) Describe the preparation, properties and uses of Carbon Fibers [7M]
8. What are conducting polymers? How are they classified? Write the synthesis and Engineering applications of conducting polymers. [12M]
9. Write the preparation, properties and application of Buna-S rubber and Buna-N rubber [12M]
10. A) Write a note on Thermoplastic and Thermosetting resin. [6M]
    B) Write the preparation, properties and uses of Phenol-Formaldehyde resin. [6M]

UNIT-IV
INSTRUMENTAL METHODS AND APPLICATIONS

1. A) Write a short note on Beer-Lambert's Law. [5M]
   B) Write a note on atomic absorption and molecular absorption. [7M]]
2. Define P^H ? Write principle and application of P^H metry. [12M]
3. Explain the working principle of Atomic Absorption Spectrometer and How will you determine the nickel using by AAS? [12M]
4. Give an account on principle and instrumentation of IR spectroscopy. Explain stretching and bending vibrations. [12M]
5. Explain principle and instrumentation of UV-visible spectroscopy with neat diagram. [12M]
6. What is meant by Chromatography ? Define the main parts of an High Performance Liquid Chromatography (HPLC). [12M]
7 .A) Explain the principle and instrumentation of Gas Chromatography. [8M]
   B)What are the applications of Gas Chromatography [4M]
8. Write short notes on
   A) Potentiometry [6M]
   B) Conductometry [6M]
9. Which methods are you using to separate from the Gaseous Mixtures ? [12M]
10. What are the methods do you follow to separate from the Liquid Mixtures ? [12M]

UNIT-V
ADVANCED ENGINEERING MATERIALS

1.A) What is basic lock and key principle ? [6M]
   B) Write a short note on Complementarity. [6M]
2.Write a brief note on Fullerenes and Carbon nano tubes [12M]

3. Explain the applications of supramolecules in	
A) Sensors ,Gas storage.	[8M]
B) Molecular switches.	[4M]
4.A) Write a note on Liquid Insulating Materials	[5M]
B) Write the Properties of Nanomaterials.	[7M]
5. Explain in detail about principle and application of semiconductors?	[12M]
6. Discuss about Super conductors and their applications?	[12M]
7. A)Define Dielectrics ? What are the characteristics of Electrical Insulators.	[6M]
B)Classification of Insulating material and their applications.	[6M]
8. A)What is meant by Nanomaterials ? How are Nanomaterials Classified.	[4M]
B)How do you apply Catalyst , medical in the application of supramolecules?	[8M]
9. A)Write an account on Carbon Nano Tubes.	[6M]
B)Write a note on Fullerenes	[6M]
10.A) Write a note on Super Capacitors.	[7M]
B)Write a note on Liquid Insulating Materials.	[5M]