P. P. SAVANI UNIVERSITY

First Semester of M.Sc. Examination
February-2022
SSCH7090–Analytical Chemistry & Instrumentation Techniques
10.02.2022, Thursday   Time: 12:00 p.m. to 02:30 p.m.   Maximum Marks: 60

Instructions:
1. The question paper comprises of two sections.
2. Make suitable assumptions and draw neat figures wherever required.
3. Use of scientific calculator is allowed.

Section-I

Q.1   Very Short Questions (Attempt any five)   [10]
1.1   Define: Coulometric method and Give its types.
1.2   What are the Precautions to be adopted with Gasometric coulometer?
1.3   What is Ohmic potential? Determine it Units.
1.4   Why Cell Potential is less than Thermodynamic Potential?
1.5   Draw shapes of Voltammogram of different pulse voltammetry.
1.6   What is DME, HMDE and SMDE?

Q.2   Write Short Notes (Attempt any two)   [06]
2.1   Explain Kinetic Polarization.
2.2   Give application of Coulometric Titration.
2.3   Explain Pulse Voltammetry in detail.

Q.3   Detail questions (Attempt any two)   [14]
3.1   Calculate the time needed for a constant current of 0.96 A to deposit 0.5 g of Co(II) as elemental cobalt on the surface of a cathode. Relative molar mass of cobalt = 58.93
3.2   Give detail account on Faraday's first and second law of electrolysis.
3.3   Why we use DME? What are the problems associated with it?

Section-II

Q.1   Very Short Questions (Attempt any five)   [10]
1.1   **What is mass analyser? Give its types.**
1.2   What is mass spectroscopy and mass spectrum?
1.3   Write the factors which affect the deflection of ions in mass spectroscopy.
1.4   List the detectors of MS.
1.5   What is the main principle of Quadrupole mass analyser?
1.6   Give block diagram of ESR spectrometer.

Q.2   Write Short Notes (Attempt any two)   [06]
2.1   Write down the categories of Ion source.
2.2   Give comparison of FD and FI.
2.3   Give application of ESR.

Q.3   Detail questions (Attempt any two)   [14]
3.1   Explain MALDI in detail.
3.2   Explain any two mass analyser.
3.3   Explain: (i) Klystron (ii) Wavemeter (iii) Sample cavity