

Master of Science (M.Sc.) Semester-III (CBCS)
(Chemistry) Examination
Analytical Chemistry Special-I (CH-3T1)
Paper-IX

Time: Three Hours]

[Max. Marks: 60

N.B.: 1. All questions are compulsory

2. All questions carry equal marks

3. Use of Calculator is permitted

4. Draw labelled diagrams wherever necessary

1 (a) Explain the method of calibration of Gamma ray spectrometer having NaI(Tl) detector. 4

(b) What is meant by radioactivity? Give units of radioactivity and also give relations between various units. 4

(c) Explain principle and working of GM counter. 4

OR

1(d) Define half life and mean life. Calculate them for a radioisotope which decays to 20 % in 12 days. 4

(e) Explain the interaction of alpha particle with matter. 4

(f) Explain the pulse height voltage curve for a gas filled counter and various regions in it. 4

2(a) Explain cold vapour AAS for estimation of mercury. How can it be extended to arsenic estimation? 4

(b) Explain construction and working of hollow cathode lamp. 4

(c) Compare AAS with flame emission spectroscopy. 4

OR

2(d) What are different types of atomizers? Explain working and advantages of total consumption burner. 4

(e) What is the role of 'beam modulation' and 'monochromator' in AAS. 4

(f) What are chemical interferences in AAS? How can they be overcome? 4

3(a) Explain principle and applications of Anodic Stripping Voltammetry. 4

(b) Explain catalytic effects in voltammetry. 4

(c) Explain cyclic voltammogram of reversible redox system with example. 4

OR

3(d) What are electrochemical sensors? Explain construction and working of potentiometric sensor with suitable example. 4

(e) Explain various types of carbon electrodes used in voltammetry. Give advantages of carbon electrodes. 4

(f) Give principle and technique in Adsorptive Stripping Voltammetry. 4

4(a) Draw and explain Jablonski diagram. Name the allowed and forbidden transitions in it. 4

(b) Discuss instrumentation in nephelometry. How it differs from turbidimetry? 4

(c) Draw a well labelled diagram of instrumentation involved in PAS. 4

OR

4(d) How will you estimate copper and nickel in a mixture using electrogravimetry? 4

(e) Explain the terms: (i) Fluorescence quenching (ii) back emf . 4

(f) Explain the instrumentation of fluorometry. 4

5(a) Define RBE and Gray. Convert a dose of 127.5 kGy into eV. 3

(b) Explain the term ' flame profile' in AAS. 3

(c) What is the effect of adsorption on cyclic voltammograms? 3

(d) Explain Faraday's first law of electrolysis and give its application. 3