

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2023
(Fourth Semester)

Branch – CHEMISTRY

ANALYTICAL CHEMISTRY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- Which of the following ways Gas chromatography can be performed?
(i) Only in columns
(ii) Only on plane surfaces
(iii) Either in columns or on plane surfaces
(iv) Neither in columns nor on plane surfaces
- The basis on which mass spectrometer separates ions.
(i) Mass (ii) Charge
(iii) Molecular weight (iv) Mass to charge ratio
- Which of the following is not an application of Flame emission photometers?
(i) Analysis of biological fluids
(ii) Determination of sodium, and potassium in soil
(iii) Determination of metals such as Mn, Cu
(iv) Analysis of complex mixtures
- Identify the property measured in DTA?
(i) Change in temperature (ii) Change in weight
(iii) Heat evolved or absorbed (iv) Rate of change in weight
- Find the auxiliary electrode in polarography?
(i) Dropping mercury (ii) Mercury pool
(iii) Graphite electrode (iv) Rotating platinum electrode

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- a. Explain the basic principles of HPLC.
OR
b. State the principle of paper electrophoresis.
- a. Explain the following mass spectrometry terms i) Molecular ions
ii) Meta stable ions iii) Isotopic abundance.
OR
b. Explain the mass spectrum for acetaldehyde.
- a. Evaluate the absorption sensitivity and detection limits of AAS (atomic absorption Spectroscopy).
OR
b. Show the comparison between atomic absorption and emission spectroscopy.
- a. Illustrate the factors affecting TGA and DTA curves.
OR
b. Explain the principle and applications of Differential Scanning Colorimetry.

Cont...

10. a. Evaluate the basic theory of cyclic voltammetry.
OR
b. Illustrate the principle of polarography.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a. Appraise the principle, instrumentation, and applications of Gas Chromatography (GC).
OR
b. Assess the Ion exchange chromatography in detail.
12. a. Criticize the basic principles and instrumentation of mass spectroscopy.
OR
b. Predict the following.
(i) McLafferty Rearrangement (ii) Nitrogen rule.
13. a. Appraise the principle, instrumentation, and applications of atomic absorption spectroscopy.
OR
b. Enumerate the emission spectra with instrumentation.
14. a. Interpret the TGA curve expected on heating calcium oxalate monohydrate ($\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$) in the air in the range $30^\circ\text{-}1000^\circ\text{C}$.
OR
b. Evaluate the principles, instrumentation, and applications of DTA.
15. a. Elucidate the theory of amperometric titrations.
OR
b. Assess the principle and applications of coulometric titration.

Z-Z-Z

END