

Master of Science (M.Sc.)Analytical Chemistry
Examination: November 2025

Day &Date	Semester	Subject Name	Time	Code	Max. Marks
Tuesday 25/11/2025	I	Analytical Chemistry Paper I	11.00 am to 1.00pm	115211	50

Instruction: I) All Questions are compulsory.

II) Draw Neat Labelled Diagram.

Q.1 Attempt any FIVE of the following (10)

1. State the basic principle of electroanalytical techniques ?
2. What is a buffer solution?
3. State the principle of neutralization titration ?
4. What is a linear segment titration curve ? When are they typically observed ?
5. State the basic principle of chromatography ?
6. What type of packaging is used in SEC columns?
7. Give one application of Supercritical Fluid Extraction ?

Q. 2 Attempt any TWO of the following (10)

1. Explain the fundamental principle and theory behind electroanalytical techniques ?
2. Explain how to calculate percentage by mass, percentage by volume, and mole fraction for the components in solution. Provide example calculations ?
3. Discuss the importance of instrument calibration in analytical chemistry. Describe the general process of calibrating an analytical instrument?

Q. 3 Attempt any TWO of the following (10)

1. Explain the principle of complexometric titrations, highlighting the role of chelating agents like EDTA. Give one application of complexometric titration ?
2. Describe the basic steps involved in a typical titration method?
3. What are non-aqueous titrations ? When are they used ?

Q. 4 Attempt any TWO of the following (10)

1. Describe the principle and basic instrumentation of Supercritical Fluid Extraction?
2. Describe the technique of High – Performance Liquid Chromatography (HPLC) including its basic instrumentation and detection methods. Discuss two important applications of HPLC?
3. Explain the theory behind Size Exclusion Chromatography (SEC). Describe the different types of packing materials used in SEC columns?

Q. 5 Attempt any TWO of the following (10)

1. Differentiate between accuracy and precision using suitable examples. Explain the relationship between these two terms and the concept of confidence limits?
2. Describe the T-test and its different forms. When is the T-test used for hypothesis testing in analytical Chemistry?
3. Explain the concepts of mean and standard deviation in statistical analysis. How do they describe the central tendency and spread of a dataset ?

***** END OF PAPER*****

Master of science Analytical Chemistry**Examination: Nov-Dec. – 2025.**

Day & Date	Semester	Subject	Time	Code	Marks
Thursday 27/11/2025	I	Food and biochemical analysis	11.00 AM TO 01.00 PM	115212	50

INSTRUCTION ALL QUESTION ARE COMPULSORY**Q. 1) Attempt any Five of the following (10)**

1. What characteristics make an ideal food preservative?
2. How does labeling serve as a quality control tool?
3. Why is iodine value important for fats and oils?
4. What are the three major categories of food contamination?
5. What tests detect added water in milk?
6. How can added sugars in honey be identified?
7. How do electrolytes maintain fluid balance in the body?

Q. 2) Attempt any two of the following (10 M) (10)

1. Explain the organizational structure of FSSAI. What are the qualifications required and roles assigned to different authorities within the organization?
2. Explain the complete food production cycle in industries, highlighting critical control points?
3. What are the basic tools of quality control with specific reference to food labeling requirements?

Q. 3) Attempt any two of the following (10)

1. Classify the different types of contamination that can occur during food production and explain prevention strategies for each?

2. Describe the laboratory procedures for determination of ash value and moisture value content in food samples?
3. Classify food colors based on their source and chemical composition. Draw and explain the structure of a common food dye?

Q. 4) Attempt any two of the following **(10)**

1. Draw a neat labeled diagram of the liver and explain the components of a comprehensive liver profile. What abnormalities can be detected?
2. Describe the analysis parameters of urine tests and sputum examination. What diagnostic information do they provide?
3. Explain well-labeled diagrams of the thyroid gland and elaborate on the hormones and markers tested in a thyroid profile.

Q. 5) Attempt any two of the following **(10)**

1. Describe the common adulterants found in milk and detail the laboratory tests used in dairy products?
2. Explain the methods to identify adulteration in honey and distinguish pure honey from adulterated variants?
3. Discuss the quality parameters and adulteration tests for eggs, meat, and fish?

****** BEST OF LUCK ******

M.SC. ANALYTICAL CHEMISTRY**Examination: November 2025**

Day & Date	Semester	Subject Name	Time	Code	Max. Marks
Saturday 29/11/2025	I	Drug Laws & Packaging	11:00 am to 01:00 pm	125211	50

Instruction: All Questions are compulsory.**Q.A) Attempt any FIVE of the following. (10)**

1. Define Martindale (Extra Pharmacopoeia)
2. Write the function of Special Council of Pharmacy
3. What are the Criteria for selection of packaging material?
4. Define labelling with Examples.
5. Write short note on ECO Marks.
6. Write the importance of Codex.
7. What is ICH ? And write types of ICH Guidelines.

Q. B) Attempt any TWO of the following. (10)

1. Describe the Ayurvedic Pharmacopoeia and its significance.
2. Describe the role of CODEX Alimentarius in ensuring global food and pharmaceutical safety.
3. Discuss the evolution and development of pharmacopoeias, highlighting their impact on pharmaceutical regulation.

Q. C) Attempt any TWO of the following (10)

1. Explain US-FDA investigation Process of New drug.
2. Write a note on Pharmacy Council of India act 1948.
3. Explain International Conference of Harmonization.

Q. D) Answer Any TWO of the following. (10)

1. Write a note on WHO and its importance in pharmaceutical Industry?
2. Explain FSSAI act 2006 in reference of Administrative process and function.
3. Explain any Eight certification marks used in India ?

Q. E) Answer Any TWO of the following.m (10)

1. Write about packaging testing and quality assurance aspects of packaging.
2. Write any 2 Procedures for quality control test for glasses ?
3. Write any five tamper resistance packaging system.

***** END OF PAPER*****

M.Sc. Analytical Chemistry
Examination December - 2025

Day & Date	Semester	Subject Name	Time	Code	Marks
Thursday 04/12/2025	I	Research Methodology	11.00 a.m. To 01.00 p.m.	135211	50

INSTRUCTION - ALL QUESTION ARE COMPULSORY

Q.1) Attempt any Five of the following (10)

1. What types of toxic liquids are commonly found in research laboratories?
2. Why is proper ventilation critical when handling toxic chemicals?
3. What are the major applications of chemometrics in analytical chemistry?
4. How do chemical spill procedures differ based on the chemical's properties?
5. What documentation is required after a biohazard spill incident?
6. How have industrial safety regulations changed after the Bhopal disaster?
7. What are the challenges in properly segregating biomedical waste?

Q.2) Attempt any two of the following (10)

1. What are the key components of laboratory protocols 1 and 2?
2. How do you properly prepare solutions in a laboratory setting, explain with the help of examples?
3. What defines a scientific abstract, and what elements must it contain?

Q.3) Attempt any two of the following (10)

1. What are the most effective ways to represent scientific data?
2. Explain the applications of: a. Computational chemistry in modern research, b. chemical structure drawing techniques?
3. Compare and evaluate the features of academic search tools: a Google Scholar, b. SciFinder, c. Scirus?

Q.4) Attempt any two of the following (10)

1. What general safety rules must be followed in a laboratory environment?
2. How should compressed gases be handled safely in laboratory?
3. What is Personal Protective Equipment (PPE), and how does each type protect laboratory workers?

Q.5) Attempt any two of the following (10)

1. What factors contributed to the Bhopal Gas Tragedy and what were its consequences?
2. How did the Fukushima Daiichi nuclear disaster unfold, and what were its environmental impacts?
3. What provisions were established in the Indian Atomic Energy Act of 1948?
