**647510** **23MSC2AnaC204x** **Seat No :_____**

# M.Sc.(Chem.) Semester - 2 (*CBCS*) Examination
## March/April – 2026 (As Per Syllabus Year-2023)
## Analytical Chemistry (Core)

**Time: 2:30 Hours** **Marks:70**

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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**Q.1(A)** **Answer the following question.** **(04)**

(1) Define median and mode with suitable example.
(2) Define variance and give its equation.

**Q.1(B)** **Answer any two questions out of three.** **(10)**

(1) Explain Limit of Detection (LOD) and Limit of Quantification (LOQ) with example and equation.
(2) Define Precision and distinguish between intraday and interday Precision
(3) Find the value of % Relative Standard Deviation (RSD) for following:
100, 112, 121, 130, 94

**Q.2(A)** **Answer the following question.** **(04)**

(1) Draw the flow chart for major steps involved till grant of Patent.
(2) Define Trade Secrete giving suitable examples.

**Q.2(B)** **Answer any two questions out of three.** **(10)**

(1) What is Geographical Indication? Give three registered examples of from Gujarat and three from rest of the country.
(2) Define Invention as per patent law and discuss what is not an invention.
(3) What is Prior Art? Explain importance of Prior Art search in brief and give the examples of Patent database and Non-Patent Literatures

**Q.3(A)** **Answer the following question.** **(04)**

(1) Define dissolution and discuss factors affecting dissolution studies.

**Q.3(B)** **Answer any two questions out of three** **(10)**

(1) Give the principle, reaction and application of Karl Fischer titration.
(2) Discuss the process to determine % Loss on Drying (LOD) in given API sample.
(3) Discuss limit lest for Lead with reaction and passing limit.

**Q.4(A)** **Answer the following question.** **(04)**

(1) Which laboratory instrument is utilized to determine the amount of aromatics present in naphtha sample?
(2) What type of digital density meter is typically used for diesel and gasoline density measurement?
(3) Which specific standard testing instrument is required to measure the flash point of liquid gasoline?
(4) What analytical instrument is commonly used to measure the refractive index of transparent petroleum products?

**Q.4(B)** **Answer any two questions out of three.** **(10)**

(1) Describe the complete instrumental procedure required for accurately measuring the mixed aniline point of naphtha.
(2) What are the key differences in instrumental techniques used for determining water content in petrochemicals?
(3) Detail the instrumental methods and standard procedures utilized to completely evaluate the volatility of gasoline.

**Q.5(A)** **Answer the following question.** **(04)**

(1) Classify the different types of soil, list the major parameters in soil testing and discuss the significance of soil analysis in agriculture.

**Q.5(B)** **Answer any two questions out of three.** **(10)**

(1) Discuss estimation of alkalinity of given water sample with equation.
(2) Write a note on Winkler's method for Dissolved Oxygen (DO)
(3) Explain about estimation of Boron from given soil sample.

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