

Seat No.:

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A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester -4) External Examination March- 2026

US04MAICV02: INTRODUCTION TO ANALYTICAL CHEMISTRY

Date: 25/03/2026, Wednesday

Time: 01:45 PM to 04:15 PM

Total Marks: 50

Note: Figures to the right indicate full marks.

Q-1 Write the most appropriate answer from the following multiple-choice questions. [10]

- Which type of error is also known as indeterminate error?
 - Systematic error
 - Gross error
 - Random error
 - Absolute error
- Accuracy refers to...
 - Closeness between repeated measurements
 - Number of measurements
 - Closeness of measurement to the true value
 - Size of instrument
- Errors can be minimized by...
 - Ignoring results
 - Repeating measurements
 - Using fewer instruments
 - Avoiding calculations
- In iodine titration, starch is used as
 - Catalyst
 - Buffer
 - Reducing agent
 - Indicator
- Which compounds cause permanent hardness of water?
 - $\text{Ca}(\text{HCO}_3)_2$
 - $\text{Mg}(\text{HCO}_3)_2$
 - CaSO_4 and MgSO_4
 - NaHCO_3
- Which ion is determined by Mohr's method?
 - Sulfate
 - Chloride
 - Calcium
 - Magnesium
- Which indicator is used in Volhard's method?
 - Starch
 - Potassium chromate
 - Ferric ion
 - Methyl orange
- Drying or ignition of precipitate is done to
 - Remove moisture
 - Increase solubility
 - Increase volume
 - Change color
- The value used to identify compounds in TLC is...
 - pH value
 - Boiling point
 - Density
 - Rf value
- Column chromatography separates compounds based on...
 - Adsorption
 - Temperature
 - Density
 - Pressure



Q-2 (A) Discuss the various methods used for the minimization of errors in analytical measurements. [5]

(B) Write a note on the Student T-test. [5]

OR

Q-2 (A) Discuss accuracy and precision with suitable examples. [5]

(B) Explain linear regression and the correlation coefficient. [5]

Q-3 (A) Explain how starch is involved as an indicator in iodine titration. [5]

(B) Show how the potential changes during an oxidation–reduction titration for the following equilibrium reaction: [5]



OR

Q-3 (A) Write a note on the different types of EDTA titrations. [5]

(B) Discuss the method for determination of the total hardness of water samples. [5]

Q-4 (A) Discuss Volhard's method in detail. [5]

(B) Write a note on Fajan's method. [5]

OR

Q-4 (A) Differentiate between lyophobic colloids and lyophilic colloids. [5]

(B) Discuss the conditions required for precipitation in gravimetry method. [5]

Q-5 Draw the schematic diagram of Gas Chromatography (GC) and explain its main parts. [10]

OR

Q-5 (A) Write a note on the Flame Ionization Detector (FID). [5]

(B) Discuss about paper chromatography in details. [5]

