Q. Define volumetric analysis?
A: Quantitative analysis using accurately measured titrated volumes of standard chemical solutions.

Q. Differentiate volumetric analysis with gravimetric analysis.
A: Volumetric (as the name suggests) involves measuring the relative volumes of two solutions, one of known concentration, that react together. Usually this would be done by performing a titration. Gravimetric analysis involves the weighing of the unknown before and after carrying out various procedures on it. For instance you might thermally decompose it; or you might dissolve it, and then precipitate and eventually weigh, a solid from that solution.

Q. Define:

i) Normality - Normality of a solution is defined as the no. of equivalents of solute per litre of solution.

ii) Molarity - Molarity is the number of moles of a solute dissolved in a liter of solution.

iii) Standard solution - A standard solution is a solution containing a precisely known concentration of an element or a substance i.e., a known weight of solute is dissolved to make a specific volume.

iv) Redox titration - Redox titration (also called oxidation-reduction titration) is a type of titration based on a redox reaction between the analyte and titrant.

v) Oxidation reduction - Oxidation is the loss of electrons or an increase in oxidation state by a molecule, atom, or ion. Reduction is the gain of electrons or a decrease in oxidation state by a molecule, atom, or ion.

vi) Primary and secondary standards - A primary standard is a reagent that is extremely pure, stable, has no waters of hydration, and has a high molecular weight. A secondary standard is a standard that is prepared in the laboratory for a specific analysis. It is usually standardized against a primary standard.

vii) Oxidising and reducing agents - A reducing agent (also called a reductant or reducer) is the element or compound in a reduction-oxidation (redox) reaction that donates an electron to another species. An oxidizing agent (also called an oxidant, oxidizer or oxidiser) can be defined as a substance that removes electrons from another reactant in a redox chemical reaction.

viii) Indicator - A indicator is a chemical compound that undergoes a definite color change at a specific electrode potential.

Q. Differentiate between external and internal indicator.
Internal indicators are those in which one of the reactant act as self indicator. Eg KMnO4 act as self indicator in Permanganate titrations.

External indicators are which are added from outside and detects the change in pH etc. eg Phenolphthalein and Methyl Orange added in Acid base titrations.

Q. Structure of indicators.
KMnO4
n-phenyl anthranilic acid
Starch
phenolphthalein
methyl orange

Q. What is titration?
Titration is a common laboratory method of quantitative chemical analysis that is used to determine the unknown concentration of an identified analyte by accurately measuring the amount of analyte that reacted with a standard chemical solution.

An analyte is a substance or chemical constituent that is of interest in an analytical procedure.

Types of titration: Acid – base titration, redox titration, gas phase titration and complexometric titration.
Q. What is resonance and conjugation??
Resonance and conjugation are interrelated. If there is conjugation in a molecule, we can draw resonance structures to it by alternating the pi bonds. Since the pi electrons are delocalized in the whole conjugated system, all the resonance structures are valid for such molecule.
- Resonance allows a conjugated system to delocalize electrons.

Q. What is the difference between end-point and equivalence point?
The equivalence point is the point in a titration when the amount of added standard reagent is chemically equal to the amount of analyte.
The end point is the point where the indicator being used changes colour. If the indicator is chosen correctly, the end point will essentially be as near as possible at the equivalence point.

Q. Differentiate between iodometry and iodimetry.
When an analyte that is a reducing agent is titrated directly with a standard iodine solution, the method is called "iodimetry". When an analyte that is an oxidizing agent is added to excess iodide to produce iodine, and the iodine produced is determined by titration with sodium thiosulfate, the method is called "iodometry".

**External Viva**

Q) What are the different types of Titration?
Q) What are qualitative, quantitative, gravimetric and volumetric analysis?
Q) What is the molecular weight of Potassium dichromate and Mohr’s Salt?
Q) Draw the structure of: Phenolphthalein, Methyl Orange, N-phenyl anthranilic acid, EDTA, PVC, Potassium ferrocyanide and ferricyanide.
Q) Why starch isn't added at the beginning itself in the CuSO4 experiment?
Q) Why does the solution become blue-black when starch is added to it?
Q) How does an indicator work? When does it change colour?
Q) What do you understand by end point?
Q) What causes the colour change at end point?
Q) Write the chemical equation of the experiment being performed.
Q) Differentiate between Mohr process and Valhard process (experiment 8).
Q) What are millimoles?
Q) What is Huckel's rule?
Q) What is a Hypo solution?
Q) Formula of chemicals used in all experiments.
Q) What is the colour of Cu2I2?
Q) What is double titration? Do you have performed double titration in any experiment?
Q) Which method of titration is used in potassium thionate with silver nitrate and ferric alum indicator?
Q) What is the structure of phenolphthalein after it changes its colour?