

21/04/23

POORNIMA

ZERO LAB

(IFY2-21)

Syllabus :

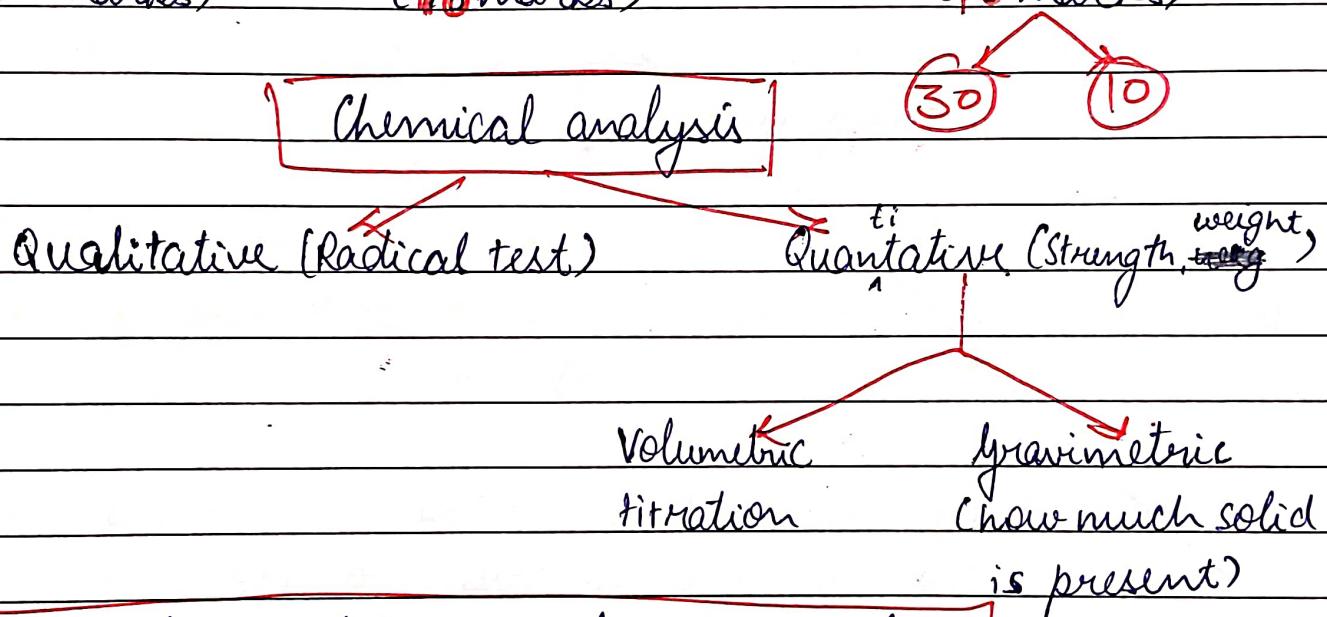
EXPERIMENTS

- 1) Determination of hardness of water by EDTA.
- 2) Determination of residual chlorine in a given water sample.
- 3) Determination of dissolved oxygen (D.O) in a given water sample.
- 4) Determination of strength of Ferrous ammonium sulphate solⁿ with the help of $K_2Cr_2O_7$ solⁿ by using diphenyl amine indicator (DPA).
- 5) Determination of strength of copper sulphate solⁿ iodometrically by using hypo solⁿ.
- 6) Determination of strength of $NaOH$, and Na_2CO_3 in the given mixed alkali solⁿ.
- 7) Determination of flesh and fire point of a given lubricating oil and cloud and power point of a given lubricating oil.
- 8) Proximate analysis of coal.
- 9) Determination of kinematic viscosity of lubricating oil by redwood viscometer at different temperature.
- 10) Synthesis of aspirin and Paracetamol.

MARKING SCHEME

Maximum marks \Rightarrow 100 marks
 Internal Assessment (IA) End term Exam
~~(60 marks)~~ ~~(40 marks)~~

I mid term IInd mid term Attendance + performance
~~(10 marks)~~ ~~(10 marks)~~ ~~(40 marks)~~



- Terminology related to volumetric analysis.
- Titration \Rightarrow It is the interaction of 2 solⁿ by which we can determine the strength of the unknown solⁿ with the help of known solⁿ.
- Standard solⁿ:
 - They are 2 types \rightarrow
 - 1> Primary standard solⁿ
 - 2> Secondary standard solⁿ

- Primary standard solⁿ: If the strength does not vary with atmospheric condition that it is formed as primary standard solⁿ.
- Standardization: Types of titration →
 - 1) Redox titration
 - 2) Acid Base neutralization
 - 3) Precipitation titration
 - 4) Complexometric titration
- Equivalence point: The point where b/w 2 solⁿ is titrated completely is equivalence point.
- Indicator: Reagent or substances which is used to indicate end point of the titration by changing its colour is called indicator.
- Type of indicator: Indicator which we use inside the conical flask or reacⁿ mixture is known as internal indicator / Indicator which cannot use inside the conical flask or reacⁿ mixture to check the end pt termed as external indicator.
eg : ~~Potassium~~ Potassium Ferricyanide $\text{K}_3[\text{Fe}(\text{CNO})_6]$
- Self -indicator: Self -indicator which acts as indicator itself termed as self indicator.
eg → KMnO_4 .

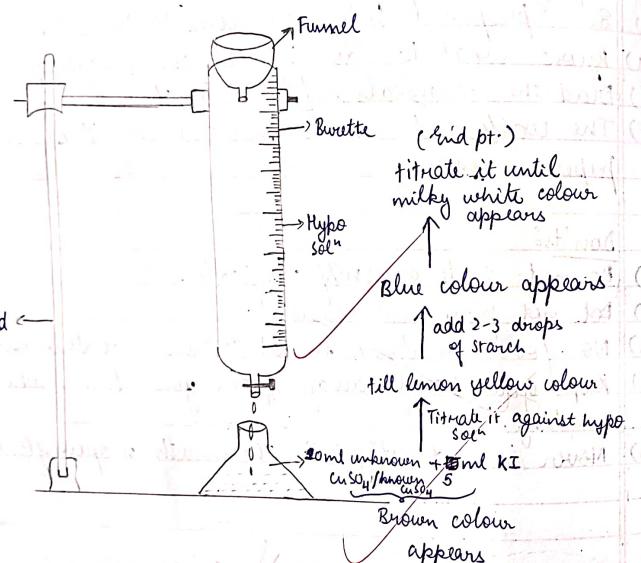
LAB RULESDo's :

- 1) wash your hand properly before leaving the lab.
- 2) Keep your work station neat and clean.
- 3) Be prepared before you come to the lab.
- 4) Know what to do in case of emergency.
- 5) Read the chemical safety instruction.
- 6) The waste and excess material should be in the paper manner.

Don'ts:

- 1) Do not taste or sniff chemicals.
- 2) Do not play mad scientist.
- 3) No food or drink in lab to avoid contamination.
- 4) Keep your hands away from your face, while working.
- 5) Never look directly into the mouth of open flask.

~~Hold our~~



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EXPERIMENT-1

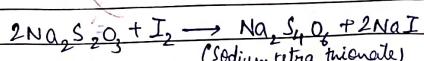
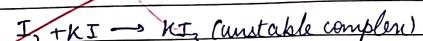
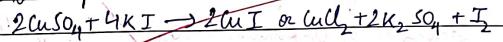
OBJECT: determine the strength of given unknown CuSO_4 solⁿ by titrating it against sodium thiosulphate solⁿ iodometrically

APPARATUS AND REAGENTS REQUIRED:

Burette, pipette, conical flask, beakers, hypo solution, standard N/40 copper sulphate, unknown CuSO_4 solⁿ, starch, indicator, 10% potassium iodide solution.

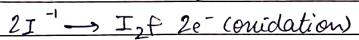
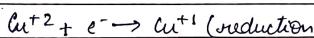
THEORY:

The strength of CuSO_4 solⁿ is determined by iodometric method. When 10% KI is added to CuSO_4 solution, cuprous iodide is formed as white ppt. and equivalent amount of iodine get liberated. This free iodine is then titrated against standard solution of hypo, using starch as an indicator. when the blue colour of iodine-starch complex will disappear till all the liberated iodine gets changed to sodium iodide. Due to formation of cuprous iodide, the colour of ppt in conical flask will be white. This indicates the end point.



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$\text{Starch} + \text{I}_2 \rightarrow \text{Iodo starch complex}$



Observation table:

Table 1 → Titration of known CuSO_4 solⁿ v/s hypo solⁿ

S.NO	Vol. of known $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ sol ⁿ (ml)	Burette reading (ml)	Vol. of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ sol ⁿ consumed (ml)	concordant reading (ml)
		Initial	Final	
1	10	0.0	9.5	9.5
2	10	0.0	9.5	9.5
3	10	0.0	9.5	9.5

Table 2 → Titration of unknown CuSO_4 v/s hypo solⁿ

S.NO	Vol. of unknown $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ sol ⁿ (ml)	Burette reading (ml)	Vol. of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ sol ⁿ consumed (ml)	concordant reading (ml)
		Initial	Final	
1	10	0.0	12.5	12.5
2	10	0.0	12.0	12.0
3	10	0.0	12.0	12.0

RESULT:

The strength of given CuSO_4 solⁿ is 7.86 gm/L.

PRECAUTIONS:

- i) Clean glass apparatus is used for titration.
- ii) Fresh reagent solutions should be prepared.
- iii) Volume of CuSO_4 solⁿ is taken with help of pipette.
- iv) End point should be observed carefully.
- v) Indicator starch is not added initially.

VIVA-VOICE:

Q.1 What is difference b/w iodometric and iodimetric titration?

Ans In iodometric titrations, Iodine is liberated from the chemical reactions of potassium of iodide and then liberated iodine is titrated against reducing agent while direct iodine is used in Iodimetric titration.

Q.2 Give names of reducing agents used in iodine titrations

Ans: Sulphite, arsenite, Thiosulphate etc.

Q.3 Give names of oxidising agents used in iodine titration?

Ans: KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$, KMnO_4 , H_2O_2 , MnO_2 etc.

Q.4 What is strength?

Ans: Normality multiplied by equivalent weight is known as strength.

Q.5 What is chemical name of hypo?

Ans: Sodium thiosulphate

Q.6 why the fresh solution of starch is used?

Ans. Old solⁿ of starch produce reddish violet colour which slowly decolorized by hypo solution as such sharp end point is not obtained.

Q.7 why always excess of KI is used?

Ans. As the solubility of I₂ in water is very low. In presence of KI it forms an unstable complex salt KI₃.

Q.8 Why hypo is generally used as a reducing agent in iodine titration?

Ans. Hypo is a primary standard so that it is used as reducing agent in iodine titration.

Q.9 Name the other name of this titration.

Ans. Redox titration, Cu⁺⁺ get reduced and I⁻ get oxidized.

Q.10 what is qualitative analysis?

Ans. The type of analysis that deals with the method which are used to determine the constituents of a compound.