CHAPTER II

MATERIALS AND METHOD
2.1.: MATERIAL AND PREPARATION OF THEIR SOLUTIONS

(i) Solution of Substrates:
Solutions of ethylene glycol, digol and methyl digol (all E. Merck) were prepared by dissolving their desired and weighed samples in doubly distilled water.

(ii) Solution of N-Bromoacetamide.
The solution of N-bromoacetamide (Lancaster) was prepared by dissolving its weighed sample in doubly distilled water. Its solution was standardized by estimating its active bromine iodometrically.

(iii) Solution of Ru (III) Chloride:
The solution of Ru (III) chloride was prepared by dissolving its 1 gm sample (E.Merck) in 0.1 N HCl solution and the volume of the solution was raised to 1000 ml.

(iv) Solution of Sodium hydroxide:
The sample of sodium hydroxide (E.Merck) in desired amount was dissolved in doubly distilled water and its solution was standardized against standard solution of oxalic acid (E.Merck) using phenolphthalein as indicator.

(v) Solution of Sodium thiosulphate:
The solution of sodium thiosulphate was prepared by dissolving the weighed sample (E.Merck), in distilled water. The solution was standardized against standard solution of copper sulphate iodometrically using starch as indicator.
(vi) Solution of mercuric acetate:

The Solution of mercuric acetate (E. Merck) was also prepared by dissolving its weighed sample in 10% acetic acid solution.

(vii) Solution of Perchlorate:

Its solution was prepared by dissolving its E. Merek sample in distilled water.

(viii) Solution of K.I.:

4% solution of KI was prepared.

(ix) Starch Solution:

1% starch (S. Merck) solution in warm distilled water was prepared.

2.2 METHOD OF INVESTIGATION:

In order to perform the kinetic investigations, following procedure was followed. Requisite volumes of standard solution of reducing glycol, sodium hydroxide, ruthenium (III) chloride, mercuric acetate and other required reagents were taken in a reaction vessel which was kept in an electrically operated thermostatic water bath set at desired temperature. The requisite volume of N-bromoacetamide standard solution was also taken in another vessel which was also placed in the same thermostat for thermal equilibrium. When the solutions had attained the desired temperature the solutions of both the vessels were mixed vigorously and stop watch was started at the time of mixing. An aliquot of reaction mixture was taken out at zero time and this portion of reaction mixture was...
estimated for N-bromoacetamide iodometrically. The progress of the reaction thereafter was monitored by determining the remaining N-bromoacetamide at different times of interval.

The readings noted at different times of interval were used to calculate the velocity constant of the reaction. A plot of (a-x) against 't' for different concentrations of N-bromoacetamide was drawn where (a-x) is the concentration of N-bromoacetamide at different times. After 10 or 15 minutes when the reaction has hardly proceeded about 10%, a tangent at point on the curve is drawn. The point corresponds to 10 minutes. From the tangent the value of (-dc/dt) is determined. The concentration at which (-dc/dt) is determined is designated as [NBA]*. From (-dc/dt) values at different concentration of NBA the orders with respect to NBA is calculated. Once the order of the reaction with respect to NBA is determined, the velocity constant of the order with respect to NBA is divided by [OH] or [substrate] or [RuCl₃]. The result thus obtained would be decisive factor for ascertaining order with respect to OH⁻ or substrate or RuCl₃.