2.1 **MATERIALS AND PREPARATIONS OF THEIR SOLUTIONS:**

Solution of reducing digol, methyldigol and ethyldigol (all E. Merck) were prepared by dissolving their desired and weighed samples in doubly distilled water.

Solution of potassium bromate (BDH, AR) was prepared by dissolving its weighed sample in doubly distilled water. Its solution was standardised by estimating its active bromine iodometrically.

Aqueous solution of ruthenium tetroxide was prepared by dissolving its 1 gram sample (Johnson & Matthey) in 0.1-N NaOH solution and the volume of solution was raised to 1000 ml. The concentration of NaOH noted for final adjustments in the kinetic runs.

Aqueous solution of sodium hydroxide (E. Merck) in desired amount was dissolved in doubly distilled water and its solution was standardised against standard solution of oxalic acid (S. Merck) using phenolphthalein as indicator.

Aqueous solution of sodium thiosulphate i.e. hypo (E. Merck) was prepared by dissolving its sample in
desired weighed amount in distilled water. The solution was standardised against standard solution of copper sulphate iodometrically using starch as indicator.

Mercuric acetate aqueous solution was prepared by dissolving its weighed sample (E. Merck) in 10% acetic acid solution.

Aqueous solution of sodium perchlorate was prepared by dissolving its E. Merck sample in desired quantity in known volume of distilled water.

10% solution of potassium iodide (E. Merck) was prepared.

1% starch solution (E. Merck) in warmed distilled water was prepared.
2.2 **METHOD OF INVESTIGATION:**

The following procedure was followed in order to obtain the kinetic data.

Requisite volumes of standard solution of reducing digol, sodium hydroxide, ruthenium (VI), mercuric acetate and other required reagents were taken in a reaction vessel which was kept in an electrically operated thermostatic waterbath set at desired temperature. The requisite volume of potassium bromate 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 solution 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 the reaction mixture was estimated for potassium bromate iodometrically with starch indicator. The progress of the reaction thereafter was monitored by determining unconsumed KBrO₃ at different intervals of time. The readings noted at different intervals of time were used to calculate the velocity constant of the reaction. A plot of (a-x) i.e. unconsumed KBrO₃ against 't' time for different concentrations of
potassium promate gives curves from which (-dc/dt) value was calculated. After 10 or 15 minutes when the reaction had hardly proceeded about 10%, a tangent at a point on curve corresponding to 10 minutes is drawn. The value of (-dc/dt) i.e. zero-order rate constant is thus determined from this tangent. The concentration of potassium bromate, at which (-dc/dt) is determined, is designated as [KBrO₃]*

The order of the reaction with respect to potassium bromate is calculated from (-dc/dt) values obtained at different concentration of potassium bromate. Once the order of the reaction with respect to potassium bromate is ascertained the order with respect to substrate or OH⁻ or Ru (VI) is determined by dividing the velocity constant with respect to KBrO₃ by either [substrate] or [OH⁻] or [Ru(VI)]. The result thus obtained will be deciding factor for determining order of the reaction with respect to either of substrates, OH⁻ and Ru (VI) and so on.