SUMMARY
The way in which the chemistry of metal chelates of Schiff bases has been and still is developing, together with the available reviews, has been summarised in Chapter-I of the present dissertation. This is followed by the description of the background of the present investigation along with the "abstract" of the results obtained in the present work under the heading "Introduction to the present work".

Chapter-II includes the experimental details and the preparations of some starting materials.

Syntheses, physical and chemical properties of cobalt(II) complexes of some dibasic tetradeionate Schiff bases are described in Section-A of Chapter-III. The cobalt(II) chelates of Schiff bases derived from salicylaldehyde and substituted salicylaldehyde with ethylenediamine and orthophenylenediamine are low-spin square planar in the solid state and in solutions of non-donor solvents, whereas these chelates expand their coordination number and attain pseudo-octahedral geometry in donor solvents. On the otherhand, cobalt(II) complexes of the Schiff bases derived from salicylaldehyde or substituted salicylaldehyde with 1,3-diaminopropane and 1,3-diaminopropane-2-ol are flattened tetrahedral (see Chapter-VII under "results and discussion").

Section-B of Chapter-III presents the preparation and properties of a series of mixed ligand chelates of cobalt(III) of the general types $\text{Co(Lig)}(L)(L')\cdot X$, $\text{Co(Lig)}(L\cdot L)\cdot n\text{H}_2\text{O}$; and
\[
\left[\text{Co(Lig)(L-L)}\right]_{7}\text{ClO}_4
\] (where, Lig\text{H}_2 = \text{a molecule of dibasic tetradentate Schiff base}; L = \text{H}_2\text{O}, \text{py}, \text{NH}_3, \text{etc.}; L' = \text{OH, Cl, etc.}; \\
X = \text{NO}_3, \text{Cl, Br, I, etc.; L-L=acac, ox, sal, SAN, gly, en, en-OH, etc.). In the latter two series of chelates the diabasic quadridentate Schiff bases are found to be in non-planar geometry (see Chapter-VII).

This section also includes two mixed chelates of the type 
\[
\left[\text{Co}_2(\text{Lig})_2\right]_{7}
\]
where one of the Schiff bases functions as a bridging bidentate ligand, while the other two coordinate in a non-planar fashion.

Chapter-IV describes the reactions of 
\[
\left[\text{Co}(\text{NH}_3)_6\right]_{7}\text{Cl}_3, \\
\left[(\text{OH})\text{Co}(\text{NH}_3)_5\right]_{7}\text{Cl}_2, \text{Na}_3\left[\text{Co}(\text{NO}_2)_6\right]_{7}, \text{and Co(acac)}_2
\]
with different Schiff bases and other chelating agents yielding varieties of mixed chelates of cobalt(III) and cobalt(II).

Preparation of several palladium(II) Schiff base complexes are included in chapter-V, and are found to be diamagnetic and square planar in geometry. Electronic spectra of these chelates are found to be similar in donor and non-donor solvents.

Chapter-VI describes the results of some preliminary investigations:

Nitration of \(N,N'\)-ethylenebis(salicylaldehydeiminato) acetylacetonate cobalt(III) monohydrate, \(\left[\text{Co(BSEN)(acac)}\right]_{7}\text{H}_2\text{O}\) with copper nitrate trihydrate yields (Chapter-VI) \(N,N'\)-ethylenebis (5,5'-dinitrosalicylaldehydeiminato) acetylacetonate cobalt(III), 
\[
\left[\text{Co}(5,5'-(\text{NO}_2)_2\text{-BSEN})(\text{acac})\right]_{7}, \text{and } N,N'\text{-ethylenebis}(5,5'\text{-dinitro-}
\]

...
salicylaldehydeiminato)-\(\gamma\)-nitroacetylacetonato cobalt(III), \(\text{Co}(5,5'-(\text{NO}_2)_2-\text{BSEN})(\text{acac-NO}_2)\)\(^{-}\), depending on the molar ratio of the reactants used. On the other hand, treatment of \(\text{Co}(\text{BSEN})\) (acac)\(^{-}\)\(\text{H}_2\)\(\text{O}\) with nitric oxide in methanol at room temperature yields N,N'-ethylenbis(salicylaldehydeiminato) isonitrosoacetylacetonate cobalt(III), \(\text{Co}(\text{BSEN})(\text{acac-NO})\)\(^{-}\) (Section-A).

Section-B of this chapter describes the syntheses of some organoderivatives of cobalt(III)-Schiff base complexes. The chelates \(\text{R-Co.}(\text{Lig})\text{H}_2\text{O}\) (where \(\text{R}=\text{Me}, \text{or Ph}; \text{Lig}=\text{dianion of BCSER}^-\text{H}_2\text{ or BHAE-H}_2\)) are presumed to be pentaordinated, whereas \(\text{R-Co.}(\text{Lig})\text{L}\)\(^{-}\) (where \(\text{R}=\text{Me} \text{ or Ph}; \text{Lig}=\text{dianions of BCSER}^-\text{or BHAE-H}_2; \text{L}=\text{py or NH}_3\)) are supposed to be hexacoordinated.

The reactions of some salts of copper(II), cobalt(II) and nickel(II) with neutral bidentate ligands have been described in Section-C of Chapter-VI. The pseudooctahedral \(\text{ML(acac)(H}_2\text{O})_2\text{ClO}_4\) (where \(\text{M}=\text{Cu}^{\text{II}}\) or \(\text{Ni}^{\text{II}}\); \(\text{L}=\text{neutral bidentate Schiff bases, X=Cl, Br}\)) have been isolated. The aquo-derivative (\(\text{M}=\text{Ni}\)) can be dehydrated to yield square planar \(\text{NiL(acac)}\text{ClO}_4\). Interestingly enough that anhydrous \(\text{Co(NO}_3)_2\) and \(\text{CoCl}_2\), when reacts with BAPE (see abbreviations) under the same conditions, yield square planar \(\text{Co(APE)(NO}_3)_2\) and \(\text{CoenCl}_2\) respectively.

Finally, the Chapter-VII includes the detailed discussion of the results obtained in the present investigation.