SUMMARY

1-In the first chapter, a literature survey of the previous studies on Schiff bases and their complexes with different metal ions is given. This survey includes spectrophotometric, potentiometric, conductometric and polarographic studies on Schiff bases and their chelates. It includes also the use of some Schiff bases as analytical reagents for detection and determination of lanthanide and transition metal ions spectrophotometrically and polarographically .

2- The experimental part (chapter II) includes the preparation of the Schiff bases under investigation. It comprises also information about the instruments used for spectrophotometric, potentiometric, conductometric, polarographic, ir, ^{1}H-nmr, epr, magnetism as well as thermal analysis measurements.

3- Chapter III includes the results and discussion and consists of two parts, the first part (A), includes the studies in solutions of complexes formed between Schiff bases under investigation with lanthanide ions (La^{3+},Sm^{3+},$Eu^{3+}$and Gd^{3+}) and transition metal ions ($Cu^{2+}$$Ag^{+}$and Au^{3+}).

The studies include conductometric, potentiometric, spectrophotometric and polarographic techniques. From conductometric measurements the stoichiometry of the different complexes is obtained . Potentiometric titration of Schiff bases and La^{3+},Sm^{3+},Eu^{3+},Gd^{3+}.Cu^{2+},Ag^{+} and Au^{3+} ions are performed in a medium of perchloric acid and sodium perchlorate. The proton- ligand stability constants log K^{H} are determined as well as the formation constants of the complexes log K_{M}.From the data obtained from the polarographic study of the complexes of Sm^{3+},Eu^{3+},and $Gd^{3+}$with all ligands in $NaClO_4$ solutions containing 30% (v/v) ethanol, the

values of the stability constants of metal complexes are given. The stoichiometry and stability constants of metal complexes are also evaluated from spectrophotometric methods namely the molar ratio, straight line and continuous variation methods. The optimum conditions for the complex formation are investigated, universal buffer of 30 % (v/v) ethanol was found to be the best medium for spectrophotometric studies. Optimum pH values, suitable wavelength, effect of time and temperature as well as the sequence of addition were also studied. The results obtained indicate that a satisfactory agreement is observed between stability constant values evaluated using the three different methods.

4- Part (B) of chapter (III) includes studies of the solid chelates which include elemental analysis, molar conductivity measurements, TGA, DTA.ir, ^{1}H-nmr, electronic absorption spectra, epr and magnetic measurements.The molar conductance of the complexes in DMF show that these chelates are electrolytes in nature and display different oxidation states, The chemical formula of the solid chelates were determined using the data obtained from thermal methods of analysis (TGA and DTA) as well as dehydration and elemental analysis . The ir-spectra of the metal chelates are studied and compared with those of the free ligands which indicate that the coordinate and covalent bonds occur through the nitrogen atom of the azomethine group and the oxygen atom of the hydroxyl group of the salicylidene part of the molecule respectively. The ir- spectra of the metal chelates exhibit a very broad band at high frequency (3300-3450 cm^{-1}) which is due to the water molecules coordinated to the central metal ions.

The ^{1}H-nmr spectra of La^{3+} chelates with the ligands under investigation were studied in DMSO and compared with those of the free