• The present thesis comprises the synthesis, characterization and biological evaluations of transition and lanthanide(III) metal complexes of quinoline derivatives.

• The quinoline aldehydes viz., 2-hydroxy-3-formyl quinoline and 2-mercapto-3-formyl quinoline and amines viz., ortho-Phenylendiamine, 1,8-Diaminonaphthalene, 2,6-Diaminopyridine, 4-Amionopyridine are used to synthesize the Schiff bases.

• The transition metal ions viz., Co(II), Ni(II) Cu(II) & Zn(II) in the form of their chlorides and lanthanide(III) metal ions viz., La(III), Pr(III), Nd(III), Sm(III), Eu(III), Gd(III), Tb(III) & Dy(III) in the form of their nitrates are used to synthesize Schiff base metal complexes.

• The newly synthesized Schiff bases and their corresponding transition and lanthanide(III) metal complexes are characterized by using various physico-chemical studies like elemental analysis, molar conductance, magnetic moment measurements, UV-Visible, IR, $^1$H NMR, FAB Mass, ESR and thermal studies to elucidate their structures.

• The biological studies like antimicrobial, DNA cleavage, analgesic, anti-inflammatory, anti-pyretic, anti-oxidant and cytotoxicity activities are carried out for the Schiff bases and their corresponding metal complexes to know about their usefulness in biological systems.
• The quinoline Schiff bases derived from ortho-Phenylenediamine, 1,8-Diaminonaphthalene and 2,6-Diaminopyridine act as dibasic tetradentate ligands while with 4-Aminopyridine act as monobasic bidentate ligand.

• The transition metal complexes exhibit coordination number six having octahedral geometry with the involvement of coordinated water. However Cu(II) complexes exhibit octahedral geometry with slight distortion.

• The lanthanide(III) complexes exhibit coordination number eight having either square-antiprismatic (D₄d) or triangular dodecahedron (D₂d) geometry with the involvement of bidentate nitrate ion and coordinated water. The metal ligand bonding in the lanthanide(III) complexes is essentially electrostatic in nature which is incorporated by magnetic and spectral data. However some evidence for, at least minor covalent interaction between the metal ion and the ligand does exists. In a given series of ligand increasing covalency is expected with decrease in size of the lanthanide ions. For diamagnetic lanthanum(III) complexes, low shifts of protons in ¹H NMR spectra are generally observed because of the deshielding of protons due to the drainage of electron density from the ligand to the metal ion. This suggests covalent interaction in these complexes. Most of the lanthanide complexes have colors resembling that of free metal ions. Since the colors of the lanthanide ions are due to the f electrons, it is reasonable to suggest that the f electrons do not participate in bonding. Perturbations in electronic spectra upon complexation are accounted for alterations in
crystal field symmetry but not simply covalent interactions. The magnetic data of the complexes are also dependent upon 4f bonding. From the above observations it can be inferred that the 4f orbitals, although energetically available are spatially less available for bonding and hence, the involvement of f orbitals in bonding in any, must be weak. Hence any covalent contribution to bonding must involve 5d or higher orbitals that are normally unoccupied in the lanthanide (III) ions.

- The biological studies like antimicrobial, DNA cleavage, analgesic, anti-inflammatory, anti-pyretic, anti-oxidant and cytotoxicity activities for quinoline Schiff bases and transition & lanthanide(III) metal complexes reveals that in general metal complexes are more potent than the corresponding Schiff bases. However Ln(III) complexes in general shows less biological activity than the transition metal complexes.

- In the present thesis, among the five chapters of transition metal complexes with quinoline Schiff bases, four chapters are published and among the three chapters of lanthanide(III) metal complexes, one chapter is published in reputed journals. Hence our investigations are worthy contributions to the advancement of the knowledge of coordination compounds of transition and lanthanide (III) chemistry.