3. OBJECTIVE OF THE PRESENT WORK

1) To obtain nanoparticle size copper ferrite.
2) To study the characterization of copper ferrite by X-Ray diffraction technique to confirm their homogeneous and single phase structure.
3) To investigate the structure of Aluminium substituted copper ferrite by calculating structural parameters like lattice constant, ionic radii and ionic bond lengths.
4) To calculate the physical density of ferrite by universal testing machine as well as Archimedes method.
5) To calculate X-Ray density.
6) To calculate the porosity of ferrite by using physical density and X-Ray density.
7) To study the microstructure of $\text{Al}^{3+}$ substituted copper ferrite by using scanning electron microscope.
8) To investigate spectroscopically $\text{Al}^{3+}$substituted copper ferrite system by using infrared absorption technique. The infrared spectroscopic study of ferrite explains the structural aspects involving metal ions distribution, valancy, bonding nature between cation, anion and inter-atomic distance etc.
9) To study the transport property and conduction mechanism by measurement A.C. and D.C. electrical resistivity.
10) To determine activation energy in both ferrimagnetic and paramagnetic region.
11) To study magnetic properties like hysteresis of copper ferrite for different compositions.
12) To study the effect of temperature on initial permeability and magnetic susceptibility of copper ferrite for different compositions.
13) The selection of ferrite material for particular application is decided by its properties such as saturation magnetization, coercive force, remanance ratio, susceptibility and Curie temperature. To study the magnetization of the sample by using high field hysteresis loop.
14) To determine Curie temperature $T_\text{C}$ in degree Kelvin of different compositions from Loria Sinha method and from magnetic susceptibility.
15) To study magnetic properties of sample by using vibrating sample magnetometer and Helmholtz double coil apparatus operating at 263 Hz frequency with a constant field of 7 Oersted.