ABSTRACT

A graph labeling is a mapping from the set of edges, vertices, or both to a set of labels. Usually the labels are positive integers.

In this thesis, we consider graph labelings that have weights associated with each vertex. If all the vertex-weights have the same value then the labeling is called *magic*. If the weight is different for every vertex then we call the labeling *antimagic*.

This thesis deals with the existence of super (a, d)-vertex-antimagic total labelings of disconnected graphs. We show that if G is even regular Hamilton graph then disjoint union of m copies of graph G is super $(a, 1)$-vertex-antimagic total for every positive integer m. To construct a super $(a, 1)$-vertex-antimagic total labeling for odd regular graphs, we use the known results on the relationship between the $(a, 1)$-vertex-antimagic total labelings and the supermagic labelings.

The thesis is also devoted to study of distance magic labelings of a union of graphs. We investigate the 1-vertex-magic vertex labelings of two families of disconnected graphs, namely a disjoint union of m copies of complete p-partite graph and a disjoint union of m copies of $2n$-regular graph $C_p[\overline{K_n}]$.