CHAPTER 6

CONCLUSION

In the second chapter, we have given distance two labeling with span value for some class of planar graphs. The $G\times P_m$ graph have been defined and distance two labeling has been exhibited which gives their span value. Also $L(3, 2, 1)$ labeling for $G\times P_m$, arbitrary simple graph is studied.

We have exhibited the prime cordial labeling for some class of trees and cycle related graphs in the third chapter. Also some new constructions and characterization results are presented. From the Figure 3.10, we conclude that the dual labeling of every prime cordial graph is not prime cordial. As an exception, for the graph with even order, if we assign labels consecutively even numbers followed by odd numbers or vice versa then dual labeling admits a prime cordial. So we arrive at the following problem.

**Problem 6.1:** Obtain the conditions under which dual labeling of prime cordial graph is again prime cordial.

Also we have considered the following general problem: Given a graph $G$ with labeling property $P$, is it possible to find the dual labeling of a graph $G$ having the same labeling property $P$? Similar work for other graph labeling problems and for graphs admitting various types of labeling is a promising area for further research.
In the fourth Chapter, we have introduced superior edge magic, superior edge antimagic definitions and generate edge bimagic graphs using edge magic graph. Also new constructions of edge antimagic graphs are given. Theorem 4.2.16 shows that $G_1 \circ G_2$ admit edge bimagic total labeling if $G_1$ has superior edge magic labeling and $G_2$ has super edge magic labeling. Further investigation can be done to obtain the conditions under which $G_1 \circ G_2$ admits edge bimagic total labeling for any two arbitrary total magic graphs.

We have introduced 1-vertex bimagic vertex labeling and have investigated the same for certain classes of graphs. Some general results on regular or bi-regular 1-vertex bimagic graphs are given. Theorem 4.5.2 shows a 1-vertex bimagic vertex labeling for certain class of complete symmetric multipartite graphs and the Theorem 4.6.3 shows a 1-vertex bimagic vertex labeling for a class of regular multipartite graphs. We observe that complete multipartite graph and multipartite graph have 1-vertex bimagic vertex labeling along with some condition. So, we arrive at the following open problems.

**Problem 6.2:** Find the conditions under which multipartite graphs admit 1-vertex bimagic vertex labeling.

**Problem 6.3:** Are there any necessary and sufficient conditions for a complete multipartite graph to have a 1-vertex bimagic vertex labeling?

Most of the techniques used in cryptography are based on discrete mathematical structures and number theory concepts. In the fifth chapter, the paired label for vertices and edges of the graph are initiated and a new method of encrypting numbers using labeled complete graph $K_n$ has been studied. We have also verified our scheme by varying $k$ (magic constant) and triangles for getting an unique cycle $C_3$ that will be magic in $K_9$ using “perl” language. Working out the complexity of our encryption and decryption technique will be our area of future work.