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# Total labeling of some new graphs with prescribed weights

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**Abstract**
Let G= (V,E) be a finite, simple and undirected graph. A Graph G is a one to one λ from EUV onto the set of consecutive integers {1, 2,.. e+v} is called edge magic total or vertex magic total labeling if all the edge weights or vertex weights are equal to a constant, respectively. A Graph G is called edge antimagic total or vertex antimagic total labeling if edge weights or vertex weights are different, respectively.
In this paper, we provide some classes of graphs that are simultaneously super edge magic total and super vertex antimagic total labeling and also simultaneously super vertex magic total and super edge antimagic total labeling. We show several results for some classes of Cycle graph are simultaneously super vertex magic total and super edge antimagic total labeling and some classes of kite, sun, prism, paw, cricket graphs are simultaneously super edge magic total and super vertex antimagic total labeling.

**Keywords:** Super edge magic total labeling, Super edge antimagic total labeling, Super vertex magic total labeling, Super vertex antimagic total labeling, Total labeling

## 1. Introduction
In this paper we consider G = (V, E) finite, simple, undirected graphs, with vertex set V (G) and Edge set E (G). A labeling or valuation or numbering of a graph G is an assignment of integers to the vertices or edges or both subject to certain conditions. If only vertices are labeled in a graph, then the labeling is called vertex labeling. If only edges are labeled in a graph, then the labeling is called edge labeling. If both vertices and edges are labeled in a graph, then the labeling is called total labeling. The edge weight of an edge under the total labeling is the sum of the edge label and the label of its end vertices. The vertex weight of an vertex under total labeling is the sum of the vertex label and the labels of its incident edges. A labeling is called edge magic total (vertex magic total) if the edge weights (vertex weights) are all the same. If the edge weights (vertex weights) are pairwise distinct then the total labeling is called edge antimagic total (vertex antimagic total) labeling. A Graph that admits edge magic total (edge antimagic total) labeling or vertex magic total (vertex antimagic total) labeling is called an edge magic total (edge antimagic total) graph or vertex magic total (vertex antimagic total) graph, respectively.

## 2. Main Results
A connected graph that is of regular of degree 2 is a Cycle Graph. We denote the cycle graph on n vertices by $\boldsymbol{C_n}$

**Theorem 2.1:** For odd positive integer, a Cycle $C_n$ is simultaneously super vertex magic total and super edge antimagic total if and only $5 \leq n \leq 13$.

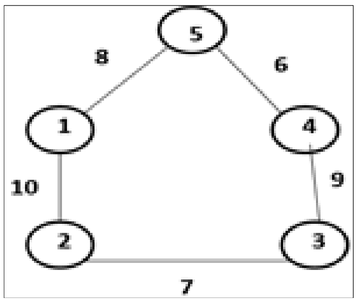
**Proof**
For $5 \leq n \leq 13$ are required labeling illustrated in fig 2.1 through fig 2.5
Fig 2.1 illustrates that the Cycle $C_5$ is simultaneously super vertex magic total and super edge antimagic total labeling with vertex weight equal 19 and with different edge weights 12, 13,14,15,16
Fig 2.5 illustrates that the Cycle $C_7$ is simultaneously super vertex magic total and super edge

antimagic total labeling with vertex weight equal 26 and with different edge weights 15,17,18,19,20,21.

Fig 2.3 illustrates that the Cycle $C_9$ is simultaneously super vertex magic total and super edge antimagic total labeling with vertex weight equal 33 and with different edge weights 18, 21, 22,24,27,30.

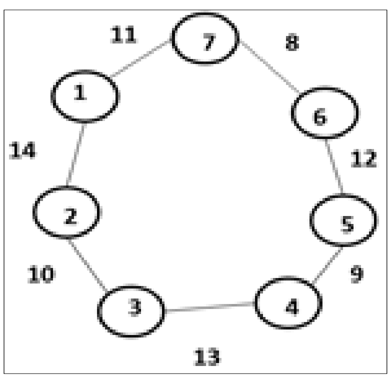
Fig 2.4 illustrates that the Cycle $C_{11}$ is simultaneously super vertex magic total and super edge antimagic total labeling with vertex weight equal 40 and with different edge weights 21,24,25,27,28,29,30,31,33,34,37.

Fig 2.5 illustrates that the Cycle $C_{13}$ is simultaneously super vertex magic total and super edge antimagic total labeling with vertex weight equal 47 and with different edge weights 24,27,29,30,32,33,34,35,36,38,39,41,44.



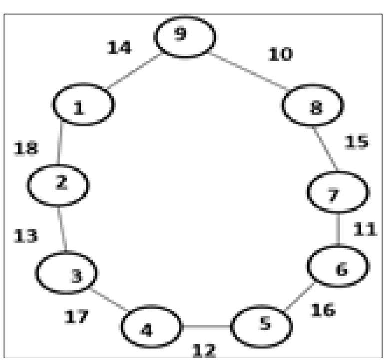

$C_5$

**Fig 1:** illustrates that the Cycle graph $C_5$ admits both super vertex magic total and super edge antimagic total labeling at simultaneously



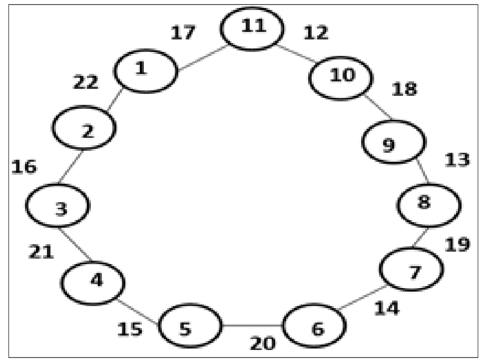

$C_7$

**Fig 2:** illustrates that the Cycle graph $C_7$ admits both super vertex magic total and super edge antimagic total labeling at simultaneously



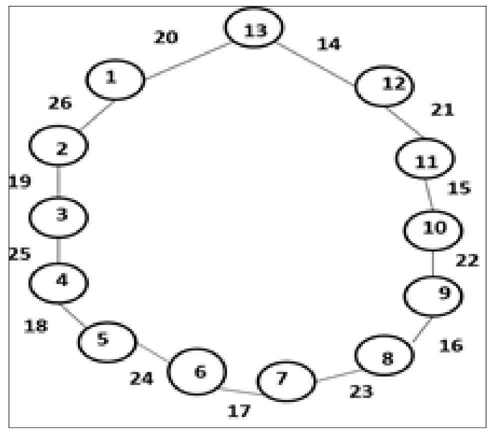

$C_9$

**Fig 3:** illustrates that the Cycle graph $C_9$ admits both super vertex magic total and super edge antimagic total labeling at simultaneously




$C_{11}$

**Fig 4:** illustrates that the Cycle graph $C_{11}$ admits both super vertex magic total and super edge antimagic total labeling at simultaneously




$C_{13}$

**Fig 5:** illustrates that the Cycle graph $C_{13}$ admits both super vertex magic total and super edge antimagic total labeling at simultaneously.

Next we will deal with the existence of total labeling of the kite graph which has simultaneously super edge magic total and super vertex antimagic total.

An (n, t) Kite Graph is a cycle of length n with t- edge path (the tail) attached to one vertex. The (n, 1) kite is a cycle of length n with an edge attached to one vertex (n, 1).

**Theorem 2.2:** For odd positive integer n, a Kite graph $K_n$ (n, t) is simultaneously super edge magic total and super vertex antimagic total if and only if 5 ≤ n ≤ 11,t=1.

**Proof**

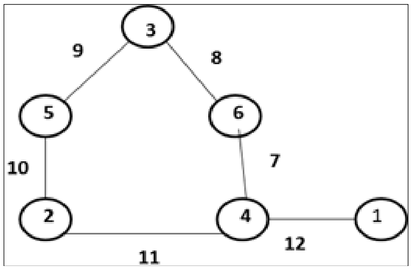
5 ≤ n ≤ 11, t=1 are the required labeling illustrated in fig 2.6 through fig 2.9

Fig 2.6 illustrates that that the kite $K_5$ is simultaneously super vertex antimagic and super edge magic total with equal edge weights 17 and different vertex weights 13,20,21,24,27,34.

Fig 2.7 illustrates that that the kite $K_7$ is simultaneously super vertex antimagic and super edge magic total with equal edge weights 22 and different vertex weights 17,25,27,28,30,31,33,45.

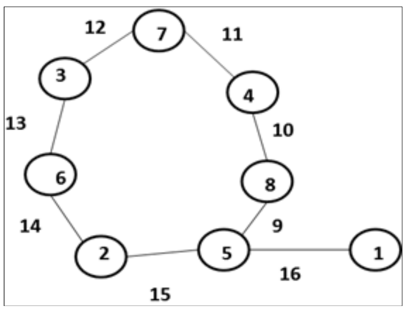
Fig 2.8 illustrates that that the kite $K_9$ is simultaneously super vertex antimagic and super edge magic total with equal edge weights 27 and different vertex weights 21,30,33,36,39,42,56.

Fig 2.9 illustrates that that the kite $K_{11}$ is simultaneously super vertex antimagic and super edge magic total with equal edge weights 32 and different vertex weights 25,35,38,39,41,42,44,47,48,67.



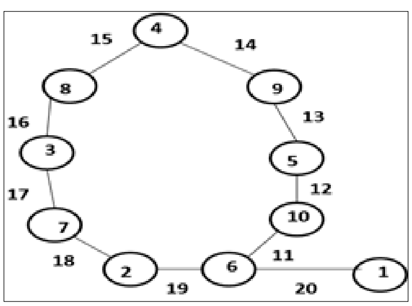

$K_5$

**Fig 6:** illustrates that the Kite graph $K_5$ admits both super vertex antimagic total and super edge magic total labeling at simultaneously.



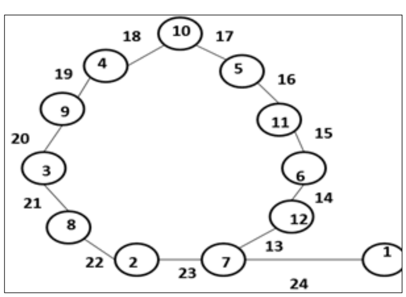

$K_7$

**Fig 7:** illustrates that the Kite graph $K_7$ admits both super vertex antimagic total and super edge magic total labeling at simultaneously.




$K_9$

**Fig 8:** illustrates that the Kite graph $K_9$ admits both super vertex antimagic total and super edge magic total labeling at simultaneousl




$K_{11}$

**Fig 9:** illustrates that the Kite graph $K_{11}$ admits both super vertex antimagic total and super edge magic total labeling at simultaneously.

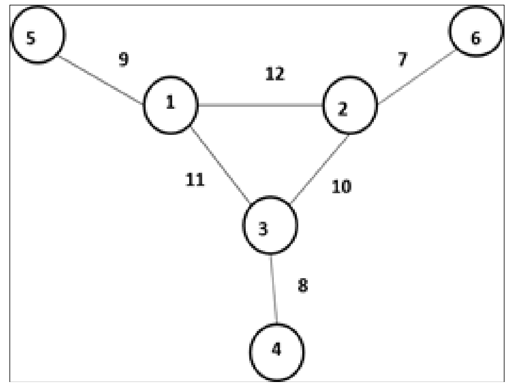
**Theorem 2.3**: For every odd positive integer n, n ≥ 3, the sun graph is simultaneously super edge-magic total and super vertex-antimagic total.

**Proof**

It has been proved in [] by Muhammad irfan, Andrea Semanicova-Fenovcikova

For Example, n=3 is the required labeling for 2.10

In fig 2.10 illustrates that Sun $s_3$ is simultaneously super edge magic total and super vertex antimagic total labeling with different vertex weight 12,13,14,21,22,24,33 and equal edge weight 15




$S_3$

**Fig 10:** illustrates that the Sun graph $S_3$ admits both super vertex antimagic total and super edge magic total labeling at simultaneously.

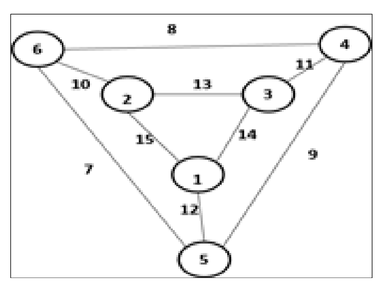
**Theorem 2.4:** For every odd positive integer n, n ≥ 3 the prism graph $Y_n$ is simultaneously super edge-magic total and super vertex-antimagic total.

**Proof**

It has been proved in [] by Muhammad irfan, Andrea Semanicova-Fenovcikova

For example, n=3 is the required labeling for fig 2.11

In fig 2.11 illustrates that prism $Y_3$ is simultaneously super edge magic total and super vertex antimagic total labeling with different vertex weight 28,30,31,32,33,42 and equal edge weight 18




$Y_3$

**Fig 11:** illustrates that the Prism graph $Y_3$ admits both super vertex antimagic total and super edge magic total labeling at simultaneously.

Next we will deal with the existence of total labeling of the cricket graph which has simultaneously super edge magic total and super vertex antimagic total.

**Theorem 2.5:** A cricket graph n=5 is simultaneously super edge magic total and super vertex antimagic total labeling.

**Proof**

n=5 is the required labeling for figure 2.12

In fig 2.12 illustrates that cricket graph is simultaneously super edge magic total and super vertex antimagic total labeling with different vertex weight 10,20,35 and equal edge weight 15.

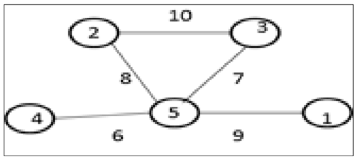



**Fig 12:** illustrates that the cricket graph admits both super vertex antimagic total and super edge magic total labeling at simultaneously.

Next we will deal with the existence of total labeling of the paw graph which has simultaneously super edge magic total and super vertex antimagic total

**Theorem 2.6:** A Paw graph n=4 is simultaneously super edge magic total and super vertex antimagic total labeling.

**Proof**

n=4 is the required labeling for figure 2.13

In fig 2.13 illustrates that Paw graph is simultaneously super edge magic total and super vertex antimagic total labeling with different vertex weight 8,16,22, and equal edge weight 12.

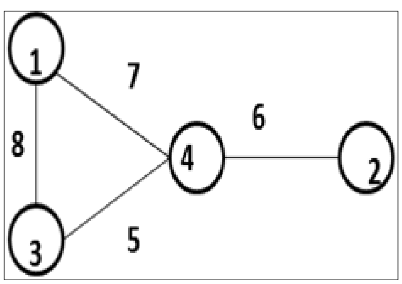



**Fig 13:** illustrates that the Paw graph admits both super vertex antimagic total and super edge magic total labeling at simultaneously.

## 3. Conclusion

In this paper we showed the existence of total labeling of some classes of cycle graph are simultaneously super vertex magic total and super edge antimagic total labeling and some classes of kite graph, cricket graph, paw graph are simultaneously super edge magic total and super vertex antimagic total labeling.

## 4. References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