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Fuzzy Tri-Magic Labeling Of Non-Isomorphic Trees Of Diameter 5 – Paper 3

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Abstract:
Background: *Let G be a finite, simple, undirected, and non-trivial graph. A fuzzy graph is said to admit tri-magic labeling if the number of magic membership values K_i's, $1 \leq i \leq 3$ differ by atmost 1 and $|K_i - K_j| \leq \frac{2}{10^r}$ for $1 \leq i, j \leq 3$, $r \geq 2$.*
Methods: *The fuzzy graph which admits a tri-magic labeling is called a fuzzy tri-magic labeling graph. The fuzzy tri-magic labeling graphs are denoted by $\tilde{T}m_0G$. A connected graph without any cycle is called a tree.*
Results: *It is established that non-isomorphic trees of diameter 5 admit Fuzzy tri-magic labeling.*
Conclusion: *In this paper it is proved that non-isomorphic trees of diameter 5 are Fuzzy tri-magic.*
Key Words: *Fuzzy Tri-Magic Labeling; Diameter of a graph; Tree.*

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I. Introduction

The graphs considered here are finite, simple, undirected, and non-trivial.[1] Graph theory has a good development in the graph labeling and has a broad range of applications.[2] Fuzzy is a newly emerging mathematical framework to exhibit the phenomenon of uncertainty in real life tribulations. A fuzzy set is defined mathematically by assigning a value to each possible individual in the universe of discourse, representing its grade or membership which corresponds to the degree to which that individual is similar or compatible with the concept represented the fuzzy set. In this paper it is proved that non-isomorphic trees of diameter 5 are Fuzzy tri-magic.

II. Definitions And Notations

In this section, we define the terms and notations essential for the formulation of our results.

Definition 1 Fuzzy graph
A fuzzy graph $G: (\sigma, \mu)$ is a pair of functions $\sigma : V \to [0,1]$ and $\mu : V \times V \to [0,1]$, where for all $u, v \in V$, we have $\mu(u, v) \leq \sigma(u) \wedge \sigma(v)$.

Definition 2 Fuzzy Labeling
Let $G = (V,E)$ be a graph, the fuzzy graph $G: (\sigma, \mu)$ is said to have a fuzzy labeling, if $\sigma : V \to [0,1]$ and $\mu : V \times V \to [0,1]$ is bijective such that the membership value of edges and vertices is distinct and $\mu(uv) \leq \sigma(u) \wedge \sigma(v)$ for all $u, v \in V$.

Definition 3 Magic membership value (MMV)[3]
Let $G: (\sigma, \mu)$ be a fuzzy graph; the induced map $g: E(G) \to [0,1]$ defined by $g(uv) = \sigma(u) + \mu(uv) + \sigma(v)$ is said to be a magic membership value. It is denoted by MMV.

Definition 4 Fuzzy tri-magic labeling
A fuzzy graph is said to admit tri-magic labeling if the magic membership values K_i's, $1 \leq i \leq 3$ are constants where number of K_i's and K_j's differ by at most 1 and $|K_i - K_j| \leq \frac{2}{10^r}$ for $1 \leq i, j \leq 3$, $r \geq 2$.

Definition 5 Fuzzy tri-magic labeling graph
A fuzzy labeling graph which admits a tri-magic labeling is called a fuzzy tri-magic labeling graph. The fuzzy tri-magic labeling graphs are denoted by $\tilde{T}m_0G$.

Definition 6 Diameter of a graph

The maximum distance between two vertices of a tree is called the diameter of a graph.

Definition 7 Tree
A connected graph without any cycle is called a tree.[5]

Notation 1[6,7]
Let $\mathbf{T}^{s_1}_{t_1,t_2,t_3,t_4}$ is a tree obtained by attaching m pendant edges, n pendant edges, a pendant edges and b pendant edges to the path P_s at the vertices v_{t_1+1}, v_{t_2+1}, v_{t_3+1} and v_{t_4+1} respectively.

III. Main Result

Theorem 1: The tree $\mathbf{T}^{6}_{2,3,4,5}$ of diameter 5 admits fuzzy tri-magic labeling (for $m \equiv 1(mod\ 3)$).
Proof:
Let G be a tree $\mathbf{T}^{6}_{2,3,4,5}$ of diameter 5. $|V(G)|$ = m + n + a +b + 6 and $|E(G)|$ = m + n + a + b + 5.
Let the vertex set and edge set of $\mathbf{T}^{6}_{2,3,4,5}$ be
$V(G) = \{v_j : 1 \le j \le 6\} \cup \{w_j : 1 \le j \le m\} \cup \{x_j : 1 \le j \le n\} \cup \{y_j : 1 \le j \le a\} \cup \{z_j : 1 \le j \le b\}$ and
$E(G) = \{v_j v_{j+1} : 1 \le j \le 5\} \cup \{v_2 w_j : 1 \le j \le m\} \cup \{v_3 x_j : 1 \le j \le n\} \cup \{v_4 y_j : 1 \le j \le a\} \cup \{v_5 z_j : 1 \le j \le b\}$
Let $r \ge 2$ be any positive integer.

Case (i) If $m \equiv 1(mod\ 3)$
Define $\sigma : V \to [0,1]$ such that
$\sigma(v_j) = (2m + 2n + 2a + 2b + 32 - j)\frac{1}{10^r}$ $\quad 1 \le j \le 6$
$\sigma(w_j) = (2m + 2n + 2a + 2b + 25 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{m-1}{3}$
$\sigma(w_j) = (2m + 2n + 2a + 2b + 24 - j)\frac{1}{10^r}$ for $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$
$\sigma(w_j) = (2m + 2n + 2a + 2b + 23 - j)\frac{1}{10^r}$ for $\frac{2(m-1)}{3} + 1 \le j \le m$

Subcase (i) If $n \equiv 0(mod\ 3)$, $a \equiv 0(mod\ 3)$
$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{n}{3}$
$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\frac{1}{10^r}$ for $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$
$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\frac{1}{10^r}$ for $\frac{2n}{3} + 1 \le j \le n$
$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{a}{3}$
$\sigma(y_j) = (m + n + 2a + 2b + 20 - j)\frac{1}{10^r}$ for $\frac{a}{3} + 1 \le j \le \frac{2a}{3}$
$\sigma(y_j) = (m + n + 2a + 2b + 19 - j)\frac{1}{10^r}$ for $\frac{2a}{3} + 1 \le j \le a$

Subcase (i)a If $b \equiv 0(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\frac{1}{10^r}$ for $\frac{b}{3} + 1 \le j \le \frac{2b}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\frac{1}{10^r}$ for $\frac{2b}{3} + 1 \le j \le b$

Subcase (i)b If $b \equiv 1(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{b+2}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\frac{1}{10^r}$ for $(\frac{b+2}{3}) + 1 \le j \le \frac{2b+1}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\frac{1}{10^r}$ for $(\frac{2b+1}{3}) + 1 \le j \le b$

Subcase (i)c If $b \equiv 2(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\frac{1}{10^r}$ for $1 \le j \le \frac{b+1}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\frac{1}{10^r}$ for $(\frac{b+1}{3}) + 1 \le j \le \frac{2(b+1)}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\frac{1}{10^r}$ for $\frac{2(b+1)}{3} + 1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated in Table no 1.

Table no 1: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
$m \equiv 1(mod\ 3), n \equiv 0(mod\ 3), a \equiv 0(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3} + 1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b}{3} + 1 \le j \le \frac{2b}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_i)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b+2}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3} + 1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b+2}{3} + 1 \le j \le \frac{2b+1}{3}$ $g(v_4z_i)$ if $\frac{l}{3} + 1 \le i \le \frac{2l}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b+1}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $\frac{2l}{3} + 1 \le i \le l$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, 1≤ i ≤ 3**	**Number of $K_i's$, 1≤ i ≤ 3**
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_i)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b+1}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3} + 1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b+1}{3} + 1 \le j \le \frac{2(b+1)}{3}$ $g(v_4z_i)$ if $\frac{l}{3} + 1 \le i \le \frac{2l}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2(b+1)}{3} + 1 \le i \le b$ $g(v_4z_i)$ if $\frac{2l}{3} + 1 \le i \le l$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3

Subcase (ii) If $n \equiv 0(mod\ 3)$, $a \equiv 1(mod\ 3)$

$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{n}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $\frac{2n}{3} + 1 \le j \le n$

$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{a+2}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 20 - j)\ \frac{1}{10^r}$ for $(\frac{a+2}{3}) + 1 \le j \le \frac{2a+1}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 19 - j)\ \frac{1}{10^r}$ for $(\frac{2a+1}{3}) + 1 \le j \le a$

Subcase (ii)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b}{3} + 1 \le j \le \frac{2b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2b}{3} + 1 \le j \le b$

Subcase (ii)b If $b \equiv 1(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $(\frac{b-1}{3}) + 1 \le j \le \frac{2b+1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $(\frac{2b+1}{3}) + 1 \le j \le b$

Subcase (ii)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\ \frac{1}{10^r}$ for $(\frac{b-1}{3})+1 \leq j \leq \frac{2b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\ \frac{1}{10^r}$ for $(\frac{2b-1}{3})+1 \leq j \leq b$

The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$ are tabulated in Table no 2.

Table no 2: The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$.

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, 1≤ i ≤ 3**	**Number of $K_i's$, 1≤ i ≤ 3**
$m \equiv 1(mod\ 3)$, $n \equiv 0(mod\ 3)$, $a \equiv 1(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \leq j \leq \frac{a+2}{3}$ $g(v_5z_j)$ if $1 \leq j \leq \frac{b}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \leq j \leq \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3}+1 \leq j \leq \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+2}{3}+1 \leq j \leq \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b}{3}+1 \leq j \leq \frac{2b}{3}$ $g(v_4z_i)$ if $1 \leq i \leq \frac{l}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \leq j \leq m$ $g(v_3x_j)$ if $\frac{2n}{3}+1 \leq j \leq n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3}+1 \leq j \leq a$ $g(v_5z_j)$ if $\frac{2b}{3}+1 \leq j \leq b$ $g(v_4z_i)$ if $1 \leq i \leq \frac{l}{3}$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \leq j \leq \frac{a+2}{3}$ $g(v_5z_j)$ if $1 \leq j \leq \frac{b-1}{3}$ $g(v_4z_i)$ if $1 \leq i \leq \frac{l}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, 1≤ i ≤ 3**	**Number of $K_i's$, 1≤ i ≤ 3**
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3}+1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+2}{3}+1 \le j \le \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b-1}{3}+1 \le j \le \frac{2b+1}{3}$ $g(v_4z_i)$ if $\frac{l}{3}+1 \le i \le \frac{2l}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b+1}{3}+1 \le j \le b$ $g(v_4z_i)$ if $\frac{2l}{3}+1 \le i \le l$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a+2}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3}+1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+2}{3}+1 \le j \le \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b-1}{3}+1 \le j \le \frac{2b-1}{3}$ $g(v_4z_i)$ if $\frac{l}{3}+1 \le i \le \frac{2l}{3}$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, 1≤ i ≤ 3**	**Number of $K_i's$, 1≤ i ≤ 3**
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b-1}{3}+1 \le j \le b$ $g(v_4z_i)$ if $\frac{2l}{3}+1 \le i \le l$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3

Subcase (iii) If $n \equiv 0(mod\ 3)$, $a \equiv 2(mod\ 3)$

$\sigma(x_j) = (m+2n+2a+2b+23-j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{n}{3}$

$\sigma(x_j) = (m+2n+2a+2b+22-j)\ \frac{1}{10^r}$ for $\frac{n}{3}+1 \le j \le \frac{2n}{3}$

$\sigma(x_j) = (m+2n+2a+2b+21-j)\ \frac{1}{10^r}$ for $\frac{2n}{3}+1 \le j \le n$

$\sigma(y_j) = (m+n+2a+2b+21-j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{a+1}{3}$

$\sigma(y_j) = (m+n+2a+2b+20-j)\ \frac{1}{10^r}$ for $(\frac{a+1}{3})+1 \le j \le \frac{2(a+1)}{3}$

$\sigma(y_j) = (m+n+2a+2b+19-j)\ \frac{1}{10^r}$ for $\frac{2(a+1)}{3}+1 \le j \le a$

Subcase (iii)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\ \frac{1}{10^r}$ for $\frac{b}{3}+1 \le j \le \frac{2b}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\ \frac{1}{10^r}$ for $\frac{2b}{3}+1 \le j \le b$

Subcase (iii)b If b $\equiv 1(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\ \frac{1}{10^r}$ for $\frac{b-1}{3}+1 \le j \le \frac{2(b-1)}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\ \frac{1}{10^r}$ for $\frac{2(b-1)}{3}+1 \le j \le b$

Subcase (iii)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b+1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\ \frac{1}{10^r}$ for $(\frac{b+1}{3})+1 \le j \le \frac{2b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\ \frac{1}{10^r}$ for $(\frac{2b-1}{3})+1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated in Table no 3.

Table no 3: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
$m \equiv 1(mod\ 3)$, $n \equiv 0(mod\ 3)$, $a \equiv 2(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a+1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+1}{3} + 1 \le j \le \frac{2(a+1)}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2(a+1)}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le l$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a+1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+1}{3} + 1 \le j \le \frac{2(a+1)}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2(a+1)}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2(b-1)}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a+1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b+1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n}{3} + 1 \le j \le \frac{2n}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a+1}{3} + 1 \le j \le 2(a+1)$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2(a+1)}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b-1}{3}+1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3

Subcase (iv) If $n \equiv 1(mod\ 3)$, $a \equiv 0(mod\ 3)$

$\sigma(x_j) = (m+2n+2a+2b+23-j)\frac{1}{10^r}$ for $1 \le j \le \frac{n+2}{3}$

$\sigma(x_j) = (m+2n+2a+2b+22-j)\frac{1}{10^r}$ for $(\frac{n+2}{3})+1 \le j \le \frac{2n+1}{3}$

$\sigma(x_j) = (m+2n+2a+2b+21-j)\frac{1}{10^r}$ for $(\frac{2n+1}{3})+1 \le j \le n$

$\sigma(y_j) = (m+n+2a+2b+21-j)\frac{1}{10^r}$ for $1 \le j \le \frac{a}{3}$

$\sigma(y_j) = (m+n+2a+2b+20-j)\frac{1}{10^r}$ for $\frac{a}{3}+1 \le j \le \frac{2a}{3}$

$\sigma(y_j) = (m+n+2a+2b+19-j)\frac{1}{10^r}$ for $\frac{2a}{3}+1 \le j \le a$

Subcase (iv)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\frac{1}{10^r}$ for $\frac{b}{3}+1 \le j \le \frac{2b}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\frac{1}{10^r}$ for $\frac{2b}{3}+1 \le j \le b$

Subcase (iv)b If $b \equiv 1(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\frac{1}{10^r}$ for $1 \le j \le \frac{b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\frac{1}{10^r}$ for $(\frac{b-1}{3})+1 \le j \le \frac{2b+1}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\frac{1}{10^r}$ for $(\frac{2b+1}{3})+1 \le j \le b$

Subcase (iv)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\frac{1}{10^r}$ for $1 \le j \le \frac{b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\frac{1}{10^r}$ for $(\frac{b-1}{3})+1 \le j \le \frac{2b-1}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\frac{1}{10^r}$ for $(\frac{2b-1}{3})+1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated below in Table no 4.

Table no 4: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
$m \equiv 1(mod\ 3), n \equiv 1(mod\ 3), a \equiv 0(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, $1 \le i \le 3$**	**Number of $K_i's$, $1 \le i \le 3$**
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3}+1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b}{3}+1 \le j \le \frac{2b}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b}{3}+1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3
	$b \equiv 1 (mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3}+1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b-1}{3}+1 \le j \le \frac{2b+1}{3}$ $g(v_4z_i)$ if $1 \le i \le l$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b+1}{3}+1 \le j \le b$ [illegible]	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3
	$b \equiv 2 (mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3}+1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b-1}{3}+1 \le j \le \frac{2b-1}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b-1}{3}+1 \le j \le b$ [illegible]	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3

Subcase (v) If $n \equiv 1(mod\ 3)$, $a \equiv 1(mod\ 3)$
$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{n+2}{3}$
$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $(\frac{n+2}{3}) + 1 \le j \le \frac{2n+1}{3}$
$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $(\frac{2n+1}{3}) + 1 \le j \le n$
$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{a-1}{3}$
$\sigma(y_j) = (m + n + 2a + 2b + 20 - j)\ \frac{1}{10^r}$ for $(\frac{a-1}{3}) + 1 \le j \le \frac{2a+1}{3}$
$\sigma(y_j) = (m + n + 2a + 2b + 19 - j)\ \frac{1}{10^r}$ for $(\frac{2a+1}{3}) + 1 \le j \le a$

Subcase (v)a If $b \equiv 0(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b}{3} + 1 \le j \le \frac{2b}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2b}{3} + 1 \le j \le b$

Subcase (v)b If $b \equiv 1(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b-1}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b-1}{3} + 1 \le j \le \frac{2(b-1)}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2(b-1)}{3} + 1 \le j \le b$
Subcase (v)c If $b \equiv 2(mod\ 3)$
$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{b+1}{3}$
$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $(\frac{b+1}{3}) + 1 \le j \le \frac{2b-1}{3}$
$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $(\frac{2b-1}{3}) + 1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated in Table no 5.

Table no 5: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, 1≤ i ≤ 3**	**Number of $K_i's$, 1≤ i ≤ 3**
$m \equiv 1(mod\ 3), n \equiv 1(mod\ 3), a \equiv 1(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a-1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3} + 1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a-1}{3} + 1 \le j \le \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b}{3} + 1 \le j \le \frac{2b}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a-1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3} + 1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a-1}{3} + 1 \le j \le \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b-1}{3} + 1 \le j \le$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2(b-1)}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a-1}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b+1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3} + 1 \le j \le \frac{2n+1}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a-1}{3} + 1 \le j \le \frac{2a+1}{3}$ $g(v_5z_j)$ if $\frac{b+1}{3} + 1 \le j \le$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3} + 1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a+1}{3} + 1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b-1}{3} + 1 \le j \le b$ $g(v_4z_i)$ if $1 \le i \le \frac{l}{3}$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3

Subcase (vi) If $n \equiv 1(mod\ 3)$, $a \equiv 2(mod\ 3)$

$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{n+2}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $(\frac{n+2}{3}) + 1 \le j \le \frac{2n+1}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $(\frac{2n+1}{3}) + 1 \le j \le n$

$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{a-1}{3}$

$\sigma(y_j) = (m+n+2a+2b+20-j)\,\frac{1}{10^r}$ for $(\frac{a-1}{3})+1 \le j \le \frac{2a-1}{3}$

$\sigma(y_j) = (m+n+2a+2b+19-j)\,\frac{1}{10^r}$ for $(\frac{2a-1}{3})+1 \le j \le a$

Subcase (vi)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $\frac{b}{3}+1 \le j \le \frac{2b}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $\frac{2b}{3}+1 \le j \le b$

Subcase (vi)b If $b \equiv 1(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b+2}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $(\frac{b+2}{3})+1 \le j \le \frac{2b+1}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $(\frac{2b+1}{3})+1 \le j \le b$

Subcase (vi)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b+1}{3}$

$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $(\frac{b+1}{3})+1 \le j \le \frac{2(b+1)}{3}$

$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $\frac{2(b+1)}{3}+1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated in Table no 6.

Table no 6: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
$m \equiv 1(mod\ 3), n \equiv 1(mod\ 3), a \equiv 2(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+2}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+2}{3}+1 \le j \le \frac{2n+1}{3}$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2n+1}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3

Subcase (vii) If $n \equiv 2(mod\ 3)$, $a \equiv 0(mod\ 3)$

$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{n+1}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $(\frac{n+1}{3}) + 1 \leq j \leq \frac{2(n+1)}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $\frac{2(n+1)}{3} + 1 \leq j \leq n$

$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{a}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 20 - j)\ \frac{1}{10^r}$ for $\frac{a}{3} + 1 \leq j \leq \frac{2a}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 19 - j)\ \frac{1}{10^r}$ for $\frac{2a}{3} + 1 \leq j \leq a$

Subcase (vii)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b}{3} + 1 \leq j \leq \frac{2b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2b}{3} + 1 \leq j \leq b$

Subcase (vii)b If $b \equiv 1(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b-1}{3} + 1 \leq j \leq \frac{2(b-1)}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2(b-1)}{3} + 1 \leq j \leq b$

Subcase (vii)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b+1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $(\frac{b+1}{3}) + 1 \leq j \leq \frac{2b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $(\frac{2b-1}{3}) + 1 \leq j \leq b$

The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$ are tabulated in Table no 7.

Table no 7: The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$.

Nature of m, n, a	**Nature of b**	**Edges**	**MMV $K_i's$, $1 \leq i \leq 3$**	**Number of $K_i's$, $1 \leq i \leq 3$**
$m \equiv 1(mod\ 3), n \equiv 2(mod\ 3), a \equiv 0(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \leq j \leq \frac{a}{3}$ $g(v_5z_j)$ if $1 \leq j \leq \frac{b}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \leq j \leq \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3} + 1 \leq j \leq \frac{2(n+1)}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3} + 1 \leq j \leq \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b}{3} + 1 \leq j \leq \frac{2b}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b}{3}+1 \le j \le b$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b-1}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3}+1 \le j \le \frac{2(n+1)}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3}+1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ $\frac{b-1}{3}$ …	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2(b-1)}{3}+1 \le j \le$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$ $g(v_4y_j)$ if $1 \le j \le \frac{a}{3}$ $g(v_5z_j)$ if $1 \le j \le \frac{b+1}{3}$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3}+1 \le j \le \frac{2(n+1)}{3}$ $g(v_3v_4), g(v_4v_5)$ $g(v_4y_j)$ if $\frac{a}{3}+1 \le j \le \frac{2a}{3}$ $g(v_5z_j)$ if $\frac{b+1}{3}+1 \le j \le$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$ $g(v_5v_6)$ $g(v_4y_j)$ if $\frac{2a}{3}+1 \le j \le a$ $g(v_5z_j)$ if $\frac{2b-1}{3}+1 \le j \le b$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3

Subcase (viii) If $n \equiv 2(mod\ 3),\ a \equiv 1(mod\ 3)$

$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \le j \le \frac{n+1}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $(\frac{n+1}{3}) + 1 \le j \le \frac{2(n+1)}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $\frac{2(n+1)}{3} + 1 \le j \le n$

$\sigma(y_j) = (m+n+2a+2b+21-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{a-1}{3}$
$\sigma(y_j) = (m+n+2a+2b+20-j)\,\frac{1}{10^r}$ for $\frac{a-1}{3}+1 \le j \le \frac{2(a-1)}{3}$
$\sigma(y_j) = (m+n+2a+2b+19-j)\,\frac{1}{10^r}$ for $\frac{2(a-1)}{3}+1 \le j \le a$

Subcase (viii)a If $b \equiv 0(mod\ 3)$
$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b}{3}$
$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $\frac{b}{3}+1 \le j \le \frac{2b}{3}$
$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $\frac{2b}{3}+1 \le j \le b$

Subcase (viii)b If $b \equiv 1(mod\ 3)$
$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b+2}{3}$
$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $(\frac{b+2}{3})+1 \le j \le \frac{2b+1}{3}$
$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $(\frac{2b+1}{3})+1 \le j \le b$

Subcase (viii)c If $b \equiv 2(mod\ 3)$
$\sigma(z_j) = (m+n+a+2b+19-j)\,\frac{1}{10^r}$ for $1 \le j \le \frac{b+1}{3}$
$\sigma(z_j) = (m+n+a+2b+18-j)\,\frac{1}{10^r}$ for $(\frac{b+1}{3})+1 \le j \le \frac{2(b+1)}{3}$
$\sigma(z_j) = (m+n+a+2b+17-j)\,\frac{1}{10^r}$ for $\frac{2(b+1)}{3}+1 \le j \le b$

The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$ are tabulated in Table no 8.

Table no 8: The magic membership values of K_i's, $1 \le i \le 3$ and number of K_i's, $1 \le i \le 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \le i \le 3$	Number of $K_i's$, $1 \le i \le 3$
$m \equiv 1(mod\ 3)$, $n \equiv 2(mod\ 3)$, $a \equiv 1(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3}+1 \le j \le$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+5}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3}+1 \le j \le$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+4}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \le j \le \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \le j \le \frac{n+1}{3}$ $g(v_1v_2), g(v_2v_3)$	$(4m+4n+4a+4b+62)\frac{1}{10^r}$ for i = 1	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3}+1 \le j \le \frac{2(m-1)}{3}$ $g(v_3x_j)$ if $\frac{n+1}{3}+1 \le j \le$	$(4m+4n+4a+4b+61)\frac{1}{10^r}$ for i = 2	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3}+1 \le j \le m$ $g(v_3x_j)$ if $\frac{2(n+1)}{3}+1 \le j \le n$	$(4m+4n+4a+4b+60)\frac{1}{10^r}$ for i = 3	$\frac{m+n+a+b+3}{3}$ for i = 3

Subcase (ix) If $n \equiv 2(mod\ 3)$, $a \equiv 2(mod\ 3)$

$\sigma(x_j) = (m + 2n + 2a + 2b + 23 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{n+1}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 22 - j)\ \frac{1}{10^r}$ for $(\frac{n+1}{3}) + 1 \leq j \leq \frac{2(n+1)}{3}$

$\sigma(x_j) = (m + 2n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $\frac{2(n+1)}{3} + 1 \leq j \leq n$

$\sigma(y_j) = (m + n + 2a + 2b + 21 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{a+1}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 20 - j)\ \frac{1}{10^r}$ for $(\frac{a+1}{3}) + 1 \leq j \leq \frac{2a-1}{3}$

$\sigma(y_j) = (m + n + 2a + 2b + 19 - j)\ \frac{1}{10^r}$ for $(\frac{2a-1}{3}) + 1 \leq j \leq a$

Subcase (ix)a If $b \equiv 0(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $\frac{b}{3} + 1 \leq j \leq \frac{2b}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $\frac{2b}{3} + 1 \leq j \leq b$

Subcase (ix)b If $b \equiv 1(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $(\frac{b-1}{3}) + 1 \leq j \leq \frac{2b+1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $(\frac{2b+1}{3}) + 1 \leq j \leq b$

Subcase (ix)c If $b \equiv 2(mod\ 3)$

$\sigma(z_j) = (m + n + a + 2b + 19 - j)\ \frac{1}{10^r}$ for $1 \leq j \leq \frac{b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 18 - j)\ \frac{1}{10^r}$ for $(\frac{b-1}{3}) + 1 \leq j \leq \frac{2b-1}{3}$

$\sigma(z_j) = (m + n + a + 2b + 17 - j)\ \frac{1}{10^r}$ for $(\frac{2b-1}{3}) + 1 \leq j \leq b$

The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$ are tabulated in Table no 9.

Table no 9: The magic membership values of K_i's, $1 \leq i \leq 3$ and number of K_i's, $1 \leq i \leq 3$.

Nature of m, n, a	Nature of b	Edges	MMV $K_i's$, $1 \leq i \leq 3$	Number of $K_i's$, $1 \leq i \leq 3$
$m \equiv 1(mod\ 3)$, $n \equiv 2(mod\ 3)$, $a \equiv 2(mod\ 3)$	$b \equiv 0(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n+1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$	$\frac{m+n+a+b+7}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \leq j \leq \frac{2(m-1)}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$	$\frac{m+n+a+b+4}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \leq j \leq m$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$	$\frac{m+n+a+b+4}{3}$ for i = 3
	$b \equiv 1(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n+1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$	$\frac{m+n+a+b+6}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \leq j \leq \frac{2(m-1)}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$	$\frac{m+n+a+b+6}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \leq j \leq m$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$	$\frac{m+n+a+b+3}{3}$ for i = 3
	$b \equiv 2(mod\ 3)$	$g(v_2w_j)$ if $1 \leq j \leq \frac{m-1}{3}$ $g(v_3x_j)$ if $1 \leq j \leq \frac{n+1}{3}$	$(4m + 4n + 4a + 4b + 62)\frac{1}{10^r}$	$\frac{m+n+a+b+5}{3}$ for i = 1
		$g(v_2w_j)$ if $\frac{m-1}{3} + 1 \leq j \leq \frac{2(m-1)}{3}$	$(4m + 4n + 4a + 4b + 61)\frac{1}{10^r}$	$\frac{m+n+a+b+5}{3}$ for i = 2
		$g(v_2w_j)$ if $\frac{2(m-1)}{3} + 1 \leq j \leq m$	$(4m + 4n + 4a + 4b + 60)\frac{1}{10^r}$	$\frac{m+n+a+b+5}{3}$ for i = 3

IV. Conclusion

In this paper, we have shown that the non-isomorphic trees of diameter 5 are fuzzy tri-magic. In this paper, we have given only for $m \equiv 1(mod\ 3)$. All the remaining cases of trees of diameter 5 are also done by us.

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