South East Asian J. of Mathematics and Mathematical Sciences
Vol. 18, No. 3 (2022), pp. 317-328

DOI: 10.56827/SEAJMMS.2022.1803.26 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

ON THE S_3-MAGIC GRAPHS

Anusha C. and Anil Kumar V.

Department of Mathematics,
University of Calicut,
Malappuram - 673635, Kerala, INDIA

E-mail : canusha235@gmail.com, anil@uoc.ac.in

(**Received:** *Oct. 05, 2021* **Accepted:** *Dec. 23, 2022* **Published:** *Dec. 30, 2022)*

Abstract: Let $G = (V(G), E(G))$ be a finite (p, q) graph and let $(A, *)$ be a finite non-abelain group with identity element 1. Let $f : E(G) \to N_q = \{1, 2, \ldots, q\}$ and let $g : E(G) \to A \setminus \{1\}$ be two edge labelings of G such that f is bijective. Using these two labelings f and g we can define another edge labeling $\ell : E(G) \to N_q \times A \setminus \{1\}$ by

$$\ell(e) := (f(e), g(e)) \text{ for all } e \in E(G).$$

Define a relation $\leq$ on the range of ℓ by:

$$(f(e), g(e)) \leq (f(e'), g(e')) \text{ if and only if } \quad f(e) \leq f(e').$$

This relation $\leq$ is a partial order on the range of ℓ. Let

$$\{(f(e_1), g(e_1)), (f(e_2), g(e_2)), \ldots, (f(e_k), g(e_k))\}$$

be a chain in the range of ℓ. We define a product of the elements of this chain as follows:

$$\prod_{i=1}^{k}(f(e_i), g(e_i)) := ((((g(e_1) * g(e_2)) * g(e_3)) * \cdots) * g(e_k).$$

Let $u \in V$ and let $N^*(u)$ be the set of all edges incident with u. Note that the restriction of ℓ on $N^*(u)$ is a chain, say $(f(e_1), g(e_1)) \leq (f(e_2), g(e_2)) \leq \cdots \leq (f(e_n), g(e_n))$. We define

$$\ell^*(u) := \prod_{i=1}^{n}(f(e_i), g(e_i)).$$