*South East Asian J. of Mathematics and Mathematical Sciences*
*Vol. 17, No. 1 (2021), pp. 153-170*

**ISSN (Online): 2582-0850**

**ISSN (Print): 0972-7752**

# ON "MIXED" MODULAR EQUATIONS OF DEGREE 21

**Vijay Yadav and S. Chandankumar***

Department of Mathematics,
S. P. D. T. College, Andheri (E),
Mumbai - 400059, Maharashtra, INDIA

E-mail : vijaychottu@yahoo.com

*Department of Mathematics and Statistics,
M. S. Ramaiah University of Applied Sciences,
Peenya Campus, Bengaluru - 560058, Karnataka, INDIA

E-mail : chandan.s17@gmail.com

(**Received:** *May 11, 2020* **Accepted:** *Oct. 02, 2020* **Published:** *Apr. 30, 2021)*

**Abstract:** In the proposed work, we establish a total of six new $P$–$Q$ modular equations involving theta–function $f(-q)$ with moduli of orders 1, 3, 7 and 21. These equations can be regarded as modular identities in the alternate theory of signature 3. As a consequence, several values of quotients of theta–function are evaluated.

**Keywords and Phrases:** Modular equations, Theta-functions.

**2020 Mathematics Subject Classification:** 33D15, 33E20, 11F20, 11F27.

## 1. Introduction

Throughout, we assume that $|q| < 1$, Ramanujan's general theta–function $f(a, b)$ is defined by

$$f(a,b) := \sum_{n=-\infty}^{\infty} a^{n(n+1)/2} b^{n(n-1)/2}, \ \ |ab| < 1. \tag{1.1}$$