PREFACE

The study of derivation in Rings got impetus soon after Posner [65] and Herstein [49] obtained some remarkable results particularly for prime rings. This study started attracting a wide circle of algebraists in the later part of the 20th century. It plays a significant role in the integration analysis, algebraic geometry, differential geometry and differential algebras. Motivated by successful application of derivation in rings, the concept of derivation in a near-ring $N$ was introduced by Bell and Mason [26] as follows: an additive endomorphism $d : N \rightarrow N$ is said to be a derivation on $N$ if $d(xy) = xd(y) + d(x)y$ holds for all $x, y \in N$. Since then this topic has become an interesting research area and many algebraists namely Aydin, Bell, Hongan, Ligh, Luh, Mason and Nurcan etc. have done a lot of work in this area.

This exposition comprises of four chapters and each chapter is further subdivided into various sections. Chapter 1 contains preliminary notions, basic definitions and some well known results required for the development of the subject in the subsequent chapters. The basic knowledge of ring theory has been preassumed. The definitions, examples, results and remarks etc. has been specified with double decimal numbers. The first figure denote the number of chapter, second represent the section in the chapter and the third point out the number of definitions, the examples, or the remarks as the case may be in a particular chapter.

In chapter 2, the concept of derivations, strong commutativity preserving derivations and Daif derivations have been studied. This chapter includes results obtained by Bell and Mason [25], Abujabal and Ashraf [1] and Wang [71]. Section 2.2
opens with the definition of scp-mappings and results obtained by Bell and Mason [25] have been discussed. Deng and Ashraf [37] initiated the study of a more general concept than scp-mappings in rings and further, similar study was carried out by Abujabal and Ashraf [1] in the setting of near-rings. Several interesting results obtained by Abujabal and Ashraf [1] are given in Section 2.3. Finally, in section 2.4 an extension of famous Posner's theorem has been given and also Leibniz' rule in the setting of near-ring has been discussed.

Chapter 3 is devoted to the study of $(\sigma, \tau)$-derivations in near-rings. Section 3.2 begins with the definition of $(\sigma, \tau)$-derivation in near-rings and is devoted to the commutativity of prime near-rings. Also, a classical result of Herstein [47] in the setting of $(\sigma, \tau)$-derivation in near-rings has been discussed. Section 3.3 begins with analog of Leibniz' rule in the setting of $(\sigma, \tau)$-derivation in near-ring and further, an extension of Posner's theorem in the setting of $(\sigma, \tau)$-derivation has been given. In Section 3.4 the concept of symmetric-bi-$(\sigma, \tau)$-derivation has been given and some results obtained by Ceven and Ozturk [32] has been presented.

Chapter 4 deals with the generalized derivation in near-rings. In this chapter, we discuss the results obtained by Bell [15] and Golbasi [42],[43]. In Section 4.2 a generalization of result due to Bell and Daif [22] has been given. Most of the results presented in this section are devoted to the study of commutativity of near-ring which admits generalized derivations satisfying certain identities. Further, Section 4.3 deals with the study of generalized derivation in near-rings which acts as a homomorphism or as an anti homomorphism of the near-ring. Finally, Section 4.4 is devoted to the study of results obtained by Bell [15]. In fact the results included
in this section are generalization of some results earlier obtained by Bell and Mason [26]. In the end of Section 4.4 a result obtained by Golbasi [42], which was further improved by Bell [15] has been studied.

At the end, an extensive bibliography of the existing literature related to the subject matter of the dissertation is included.