ABSTRACT

Radical is the property satisfied by a class of certain algebraic structure (such as rings).The primary aim of introducing radicals is to determine the structure of rings. Historically, in 1908, J.H.M Wedderburn defined for every algebra A an ideal rad A which is largest nilpotent ideal of A and this was the first known radical called Nilpotent radical. In 1930, Kothe further generalized the Wedderburn's idea by introducing nility and introduced Nil Radical in his fundamental paper.

Finally, the problem of finding appropriate generalization of Wedderburn's radical for arbitrary rings was solved in 1945 when N.Jacobson initiated the general notion of radical of arbitrary rings. Jacobson's general theory of radical has proved to be fundamental for study of structure of rings. Other radicals for instance, Baer's, Brown Mecoy radicals were introduced in thirties and forties of last century. In early fifties, the general theory of Radical was introduced independently by Kurosh[20] and Amitsur[2].

The idea of radical theory was first extended by S.Bourne[9] for semirings when he constructed Jacobson radical for a semirings. The general radical theory for semirings was investigated by D.M.Olson and several coauhors in series of their publications[29,30,31,32]. Later, the radical theory of semirings was explicitly given by B.Morak[28] in his fundamental paper.

This dissertation provides further exposition and generalization of many useful results of radical theory for semirings and polynomial semirings. The concept of Amitsur property and Polynomial equation of a radical is also generalized in the frame work of polynomial semirings.

Chapter 1 includes necessary preliminary material from semirings and polynomial semirings.

In chapter 2, a few useful results of general radical theory of semirings is reestablish by adopting interesting notations and symbols. Also at the end of this chapter, the construction of Jacobson radical class is given.

In chapter 3, the concept of radical of polynomial rings is extended for the polynomial semirings. We also generalize the results related to Amitsur property, λ-Amitsur property and polynomial equation of

polynomial rings extended for polynomial semirings. Moreover a few new results related to radical of polynomial semirings is also given.

Chapter 4 includes the notion of sum of two radical classes of semirings and polynomial semirings. In the first section, some useful results of [48] are reproduced. Later, the concept related to the sum of radical classes of polynomial rings is extended in the frame work of polynomial semirings.