INTRODUCTION

The concept of Fuzzy Sets was introduced by L. A. Zadeh [13] in 1965. Since its inception, the theory of Fuzzy Sets has developed in many directions and it is finding applications in a wide variety of fields.

This dissertation consists of three chapters. In Chapter 1, basic definitions from fuzzy set theory are stated and these are used throughout in the subsequent part of the dissertation. Concepts of fuzzy subgroupoid by Rosenfield [12] and by Liu [11] are stated and it is shown that they are equivalent. Various results depending on these definitions are proved. Then more general definition of fuzzy subgroupoid due to Anthony and Sherwood [1] is given and it is shown that Rosenfield's fuzzy subgroupoid is it's particular case. An example which motivated Anthony and Sherwood's definition is discussed. Certain results are provided to show that Anthony-Sherwood's fuzzy subgroupoid eliminates the problems uncovered in earlier definitions of fuzzy subgroupoid.

Chapter 2 deals with the notion of fuzzy subgroup as introduced by Rosenfield [12], Liu [11] and Anthony-Sherwood [1]. We have shown that concepts of fuzzy subgroup by Rosenfield and by Liu are equivalent. Anthony-Sherwood's concept of fuzzy subgroup is more general and it is shown that Rosenfield's fuzzy subgroup is it's particular case. Anthony-Sherwood's concepts of subgroup generated fuzzy subgroup and function generated fuzzy subgroup are given and these are shown to be equivalent. The necessary and sufficient conditions under which both the definitions of fuzzy subgroups are equivalent are discussed.

Chapter 3 deals with the concepts of fuzzy normal sub-
group as introduced by different mathematicians. Here we have
included concepts of fuzzy normal subgroup introduced by
Liu [11], Mukherjee-Bhattacharya [6] and Kumbhojkar [10].
It is shown that concepts of fuzzy normal subgroup by Liu and
by Mukherjee-Bhattacharya are same and concept of fuzzy normal
subgroup by Kumbhojkar is more general. With the help of an
example we have shown that fuzzy subgroup which is normal
according to Kumbhojkar's definition need not be normal acco-
rding to Liu, Mukherjee-Bhattacharya's definitions. Many inter-
esting results are proved by using these definitions of fuzzy
normal subgroup such as fuzzy homomorphism theorem, fuzzy
Lagrange's Theorem etc.