Acknowledgement

It is a pleasant task to express my thanks to all those who contributed in many ways to the success of this study and made it an unforgettable experience for me.

First and foremost I thank my guide Dr. SN Asthana for accepting me as his student. It is difficult to overstate my gratitude towards him. His guidance has helped me grow as a researcher. With his enthusiasm, inspiration, and his great efforts to explain things clearly and simply, he helped to make research easy for me. Throughout my research period, he provided encouragement, sound advice, good teaching, lots of good ideas, and insightful discussions about the research. I would have been lost without him.

My previous-guide, Dr. KC Raha has been a person from whom I have learnt the vital skill of disciplined critical thinking. He has always found time to propose consistently excellent improvements. He has supported me throughout my research work with his patience and knowledge whilst allowing me the room to work in my own way. I owe a great debt of gratitude towards him.

I thank Shri B Bhattacharya, Director, HEMRL for permitting me to pursue education while working and for allowing me to use the facilities of the institution. I also thank Shri PR Arya, Sc “F” and Shri SM Danali, Sc “F” for their encouragement and support and for permitting me access to all the required facilities.

Shri Jayaraman S, Sc “G” (Rtd) deserves a special mention for his advice and helpful discussions. I thank Dr. H Shekar, Sc “F” for his helpful discussions during this work.

I have been very much privileged to be surrounded by wonderful people at my work place. The contribution of my colleagues Dr. M N Manda, Shri NR Shah and Shri PL Waghmare has been tremendous in the completion of my Ph.D. and I am truly thankful to them for their support and help. I am indebted to my colleagues Shri S Debnath, Shri VP Ambekar, Shri SA Joshi, Shri R Sivakumaran and Shri MU Shaikh for their genuine help during my research work.

A special thanks to Shri BR Thakur, Shri D K Jawale, Mrs SM Pandy, Shri SE Bhusare and Mrs Rasalpurkar for their help in IR Intensity measurement. Thanks to
Dr. Ruben Denial, Dr. RG Sarwadekar, Shri MP Kulkarni, Shri SK Sahu, Shri MM Marate, Mrs Shaikh and Ms Sadana Kulkarni for their support and help.

For this dissertation I would like to thank my synopsis presentation committee chairman Dr. Manoj Gupta, Sc “G” and other committee members Dr. DB Sarwade, Sc “F” and Dr PB Navle, Sc “F” for their valuable suggestions.

I would also like to thank the other two members of my thesis review committee, Dr (Mrs). S D Kakade, Sc “G” and Dr RV Singh, Sc “F” for their time, interest and helpful comments. I am gratefull to Dr. (Mrs) UR Nair, Dr (Mrs) V S Bhingarkar and Shri SG Avachat for their suggestions and comments while preparing this thesis.

I especially thank my mother for unconditional love, care and encouragement. My children Preetu, Gagan and Prishta also deserve to be acknowledged for their unknowing support and love.

Finally, but most importantly, I wish to thank my wife, Mrs Sushma, for her patience, assistance and support. She was always there during the happy and hard moments to push me and motivate me. I could not have completed my research without her!! I owe everything to her!!

Besides this, several people have knowingly and unknowingly helped me in the successful completion of my Ph.D. I thank all of them and apologize to all those, whose name could not be included here.

I also ask for forgiveness for any mistakes in the draft of this thesis and am solely responsible for any errors.

RS Palaiah