ACKNOWLEDGEMENTS

It has been a proud privilege for me that, by the grace of God, I got an opportunity to work under the supervision of Dr. D. P. Khandelwal. In being associated with him I not only gained in the academic field but also learned by his example certain rare qualities which are very essential for the fruitful pursuit of research: having a broad study in the field of research with all ramifications and at the same time keeping on an intelligent track, rather than diffuse too much. Whenever I was in a difficult situation, experimental or theoretical, he not only rescued me but infused in me the enthusiasm to work harder. He would allow nothing to be done in a hurry and he would never compromise on precision. He would insist on applying independent checks and counterchecks. I cannot express in words, more so in a formal note like this my heart-felt sense of gratitude to him for his guidance during the work.

I am grateful also to Dr. H. D. Bist of I.I.T., Kanpur with whom I developed a personal bond and for whose methods of experimental work I feel great respect. As incharge of the optical spectroscopy central laboratory of I.I.T., Kanpur, he made all the vast facilities available to me. He also recorded for me the Laser Raman Spectra of some salts at the University of Western Ontario, Canada. Finally he was an active contributor and help in my research work so much so that at no stage I felt that he and the experimental facilities belong to another institution.
Shri B.K. Srivastava, Senior Research Fellow in the department, has been of constant help for the last three years, particularly in academic discussions. Miss Sunita Khandelwal helped me in the final check of the spectrum of MnSO₄·H₂O in KBr. Dr. V. N. Sarin and Y. S. Jain of I. I. T., Kanpur, have been of great help at different stages of this work. My thanks are due to all of them.

At H.B.T.I. I would like to thank many of my colleagues—Dr. D. N. S. Srivastava, Dr. A. N. Nigam and Dr. M. C. Agarwal—for general help. The last two translated scores of research papers from German and French into English for me.

I thank the Director of H.B.T.I. for providing me general facilities for this work; the Vice-Chancellor, Kanpur University for deputing me to present two research papers at Nuclear Physics and Solid State Physics Symposium at Bangalore in 1973 and at Bombay in 1974; The India Association of Cultivation of Sciences Jadavpur Calcutta for travel assistance to present a research paper at National Symposium on Molecular Spectroscopy and Molecular and Atomic Collision processes at Calcutta in 1976, and the organizer of N.P.S.P. Symposia for travel grant to attend and present a research paper at this Symposium at Ahmedabad in 1976. It is a pleasure to record that during these symposia I had useful discussions notably with Dr. R. Chidambaram, Dr. V. C. Sahni and Dr. C. L. Thaper of Bhabha Atomic Research Centre Bombay, Prof. P. S. Narayanan of Indian Institute of Sciences, Bangalore and Dr. Y. D. Gupta of Lucknow University.
Dr. P. N. Tandon, my personal friend and Professor of Mathematics at H.B.T.I. was a constant source of encouragement. I would like to acknowledge my sense of gratitude to my father Shri G. S. Gupta, my mother (who passed away in the middle of this work), my elder brother Sri S. P. Tayal and his wife Smt. Asha for the moral and material support and constant encouragement during this work. This work could not have been completed but for the understanding and patience shown by my wife Kusum and children: Deepak, Pankaj, Smita and Ashish. Their earnest desire to see me complete the work proved itself a positive asset and a driving factor for me.

I would like to thank Shri H. R. Verma for accurate typing of the thesis and Shri N. A. Singh for making multiple copies of the figures at short notice.

V. P. TAYAL