Acknowledgements

First of all, I thank the almighty God, whose immense compassion gave me opportunities to reach this stage of completion of my Ph.D. thesis. This journey is not possible without the unconditional support, suggestions, and encouragement of all my teachers, family members, friends, and well-wishers under challenging circumstances. Over these years, there have been several people who have always been with me in many odd situations and whose collaboration has played a vital role in compiling the research work as my Ph.D. thesis.

Foremost, I would like to express my deepest gratitude to my Ph.D. supervisor Prof. Chandra Shekhar and his family members, especially Shikha Ma'am, who guided me and gave unprecedented moral support for each moment of this research work and always inspired me in odd circumstances. Whenever I felt alone, their care and monitoring were unique. His guidance is unbelievable, and I consider myself very fortunate that I got the opportunity to work with my supervisor.

I am thankful to the Vice-Chancellor Prof. S. Bhattacharyya, Director Prof. A. K. Sarkar, Dean AGSR Prof. S. Krishnaswamy, Associate Dean Prof. Jitendra Panwar and Registrar Mr. E. S. Ratnakumar J., who gave me opportunity to secure the desired position in the relevant field for my work capability and to provide a suitable healthy environment for research work. Due to which I have proved myself worthy of research here.

I would like to give my cordial thanks to Prof. D. K. Maiti, Prof. Balram Dubey (Ex. HoDs), and Prof. B. K. Sharma, HoD, Department of Mathematics who provide me a golden opportunity to work in the department and finalizing this work within time. I would like to acknowledge all the faculty members and staff members of the department also for their valuable support during my research work. I extend my sincere thanks to departmental research committee (DRC) members for their helpful assistance. Also, I am thankful to the doctoral advisory committee (DAC) members, Dr. V. S. Shekhawat and Dr. Shivi Agarwal for his/her useful comments and suggestions during my Ph.D. research work.

I also thank my batchmate and co-author in the research field, Amit Kumar, for his continuous support and encouragement to do the hard work at each moment. I want to thank Prof. A. K. Malik, Mr. Neeraj Pundhir, Mr. Amit Gupta, and graduate student Er. Vandit A. Thakkar, for their support and valuable suggestions.

I would like to express my sincere gratitude to my graduation teachers, college friends, seniors and colleagues (Prof. S. C. Tiwari, Prof. P. K. Agrawal, Er. M. K. Varshney, Umesh Yadav, Dinesh Varshney, Mandeep Singh, Sachin Kumar, Preeti

Dubey, Priyanka Kumari, K. S. Pritam, S. S. Chauhan, Kapil Choudhary) and all juniors for his/her encouragement, cooperation and moral support.

I acknowledge my sincere thank to my grandfather (Mr. C. B. Varshney), grandmother (Smt. Rammurti Varshney), beloved parents (Mr. D. K. Varshney, Smt. Shashi Varshney), elder brother and sister-in-law (Er. M. K. Varshney, Er. Priya Varshney), sisters (Mamta Varshney, Jyoti Varshney), princess (Dristi Varsrshney), beloved (Beenu Varshney), and whole Varshney family for their overwhelming love, encouragement and continuous contribution of endless support.

I am also thankful to the funding agency Council of Scientific and Industrial Research (CSIR), New Delhi, and DST FIST for financial assistance as a part of this work.

Place: BITS Pilani Shreekant Varshney

Date: