Acknowledgements

I wish to express deep sense of gratitude to supervisors Prof. Devinder Mehta and Dr. J. S. Shahi, Department of Physics, Panjab University, for their invaluable guidance and steady motivation throughout the work.

I am thankful to Prof. Navdeep Goyal, Prof. Veer Pal Singh and Prof. Manjit Kaur, present and erstwhile Chairpersons, Department of Physics, for providing me necessary facilities and conducive environment for the research work.

I thank Prof. Nirmal Singh and Prof. Jatinder Goswamy for timely support and encouragement. Thank to Dr. Malkiat Chand Sidhu, Department of Botany and Mr. Baltej Singh, PAU, Ludhiana for useful suggestions in Phytoremediation studies. I like to express thanks to Dr. Kuljeet Singh, Prem Singh, Sanjeev Kumar, Samarjit Sihotra, Vivek Kumar, Sunil Kumar, Gurjeet Singh, Surender Kumar, Amit Goyal, Atul Bhalla, Heena Duggal and Vipenpal Singh, and Mr. Arun Upmanyu, Ranjit Singh, Harpreet, Maninder, Junaid and Ranjan for their constant support.

I am heartily thankful to Mr. Subash Saini for his constant technical support for various experimental setups and target holders used in the work. The support of the staff of the administrative section is duly acknowledged. I am grateful to Mr. Tejbir Singh and Jagtar Singh for providing support in using WDXRF and XRD facilities available at the SAIF Department, Panjab University. Regular availability of liquid nitrogen for the detectors due to efforts of Mr. Prem Singh, Thakur Das and Sarabjit Singh is acknowledged. The financial assistance from the UGC, New Delhi, in the form of scholarship under BSR Scheme is gratefully acknowledged.

I thank to friends Ranjeet, Pavitar, Anumeet, Satnam, Jacky, Amrinder, Ramneek, Kuldeep, Kushal, Bharti, Shivcharan, Janpreet, Sandeep, Sukhdev, Gurdev, Maninder, Mehrpreet, Sukhi, Amanjot, Amu, Cute, Navneet, Harman, Taran, Dheeru, Gursevak veer ji, Baljit didi and last but not least Gursimran for their wisdom and emotions.

I would like to pay my emotions of respect and love to parents, sister Tejinder and wife Manpreet for their ever-loving support, and motivation, which gave me confidence and impetus to work hard to reach this destination. Last but not least, I would like to thank Almighty for showering his blessings for successful completion.

April, 2018
Chandigarh, India

Gurjot Singh