ACKNOWLEDGEMENTS

I am very much thankful to ALMIGHTY for giving me an opportunity to undertake the research work and enabling me to its completion.

My heartiest sincere thank to my research supervisor Dr G M Deheri for guiding me in the fascinating field of Mathematics, for giving encouragement and support in times of need and for showing a generous attitude towards their students.

I wish to thank Prof (Dr) A B Patel, Head, Department of Mathematics and Prof (Dr) S J Bhatt, the former Head of the Mathematics Department for providing me all the facilities in the Department whenever I required.

I would like to extend my sincere thanks to Prof (Dr) Harish Padh, Vice Chancellor, Sardar Patel University for extending the hospitality and best wishes.

I thank to my teachers Dr R D Mehta, Dr D J Karia, Dr H S Mehta, Prof (Dr) H V Dedania, Prof (Dr) A H Hasmani my friends Dr P A Dabhi, Prof Jaimin and Prof Sanjay for their significant support and help at my research work.

It's pleasure to thank my friends Dr H C Patel, Dr R M Patel, Dr N D Abhangi, Prof V R Shah, Prof Urvashi
Acharya and my research fellows Prof Jimit Patel, Prof Snehal Shukla, Prof Nitin Patel, Prof Nimesh Patel, Shruti Mehta (Deputy Superintendent of Police) and Prof Mahavir Shekhavat who have contributed to my learning of Tribology through out my PhD work.

I also thank to Prof A K Ray and Dr M Nataraj for their moral support and suggestions during my work.

It is my immense pleasure to acknowledge Prof T A Desai, Head of Mathematics Department, Birla Vishvakarma Mahavidyalaya, Vallabh Vidyanagar for constant encouragement, help and guidance.

I will always remain grateful to the Principal, Dr F S Umrigar, Birla Vishvakarma Mahavidyalaya and also, Charutar Vidya Mandal, Vallabh Vidyanagar for being considerate in permitting me for research work and best wishes.

I extend my thank to all of my colleagues Prof Rajiv Gandhi, Prof (Dr) Namita Sathe, Prof Aakar Raghelia, Prof Shailesh Bhagat, Prof Milan Kansagra, Prof V G Khumbholia, Prof Nikhil Parmar, Prof Hitixa Raj, Prof Hemaxi Singh, Prof Jignasha Modh, Prof Nilesh Sonara, Prof Trideep Macwan, Prof Mehul Patel, Prof Hiral Chaudhari and Prof Nikita Soni for continuous support and help.
My special thanks to Dr Charudatt, Head of English Department, V P & R P T P Science College for helping me in drafting and proof reading for review of research articles and Dr Snehal Mevada, Structure Engineering, Dr Haresh Patalia of Mechanical Engineering, BVM Engineering college and Prof Yashoant Patel of Mechanical Engineering, ADIT college for fruitful discussion and support during my research work.

I thank to office staff of the Department for helping whenever required and also my special thanks to Shri Ramanbhai, Shri Shaileshbhai, Shri Harsadbhai and Hansaben.

My love and appreciation is extended to my wife Vaishali and son Jaimin, who have been forbearing during the years when I spent long days and nights in conducting the research and keeping up with the literature and preparation of this thesis.

The research presented in this thesis would not have been possible without blessing of my late father Eknath Gabaji Shimpi, late mother Lilaben Eknath Shimpi, my late brother Ravi Eknath Shimpi and my late father-in-law Sureshchandra Hiraman Metkar and all my family members.

Finally, I appreciate and always grateful to Prof Aakar Raghelia for an excellent type setting and graphics of this thesis.

Shimpi Mukesh Eknath