ACKNOWLEDGEMENT

All praises to ALMIGHTY who is the creator of every thing, the Most Gracious and the Merciful. First of all I express my deep sense of gratitude to my supervisor Dr. Nadeem Hasan, Professor, Department of Mechanical Engineering, ZHCET, AMU, Aligarh for his prominent guidance, indispensable suggestions, continuous encouragement and support throughout the course of work. His dedication and keen interest above all his overwhelming attitude to help his student had been solely and mainly responsible for completing my work. Under his guidance I gained a lot from his experience and was able to understand the values of research and time management.

I would like to thank Professor Mohammad Altamush Siddiqui, Chairman Department of Mechanical Engineering for providing facilities to carry out my research. I would also like to thank Professor Mirza Faisal S Baig, Dr. Syed Fahad Anwer, Dr. Saleem Anwar khan for valuable discussions and suggestions at various stages of my Ph. D work. I would like to thank Mr. Fuaad P A, Dr. Javed Mustafa and others who helped me in carrying out my research work. I would also like to thank my colleagues and friends, Dr. Mubashshir A Ansari, Dr. S M Yahya, Dr. Rashid Nizam, Mr. Haroon Ahmad, Mr. Noorul Huda, Mr. Farhan Ahmad Shameem, Mr. Shabaan H Khan, Mr. Basharat Jamil and Mr. Imran Ansari for their help whenever it was required.

I would like to express my sincere appreciations to my parents, brothers and sister for their unconditional support and encouragement. It is my privilege to thank my wife Seeme Rashid for her constant encouragement throughout my research period.