ACKNOWLEDGEMENTS

At the outset, let me pay my obeisance to Lord Krishna for catapulting me to this level of academic pursuit. Thereafter, let me express my sincere gratitude to my respected supervisors - Dr. Debashis Khan and Prof. S.K. Panda for their matured guidance, invaluable encouragement, moral support, friendship, providing enough space to work over the past five years. I owe them much for all of their superior guidance over the years.

I wish to acknowledge my sincere gratefulness to Prof. S.K. Sinha, Head, Department of Mechanical Engineering, Indian Institute of Technology (BHU), Varanasi, the previous heads Prof. A.K. Jha, Prof. A.K. Agrawal, and Prof. V.P. Singh for their kind gesture and extending all sorts of facilities in the department to pursue this kind of research work.

I would like to express my grateful thanks to my RPEC members Prof. Rajesh Kumar and Prof. P. Maiti for being part of my Ph.D. Committee and for being kind enough to make evaluation of my work-progress, extend meaningful comments and fruitful suggestions from time to time.

I am deeply indebted to Prof. Sandeep Kumar, for his help, spiritual values, precious advice and for the patience shown in our long and useful discussions. I would like to extend special thanks Prof. A.P. Harsha for his invaluable support, insightful conversations and continuous encouragement. My sincere thanks also go to Ministry of Human Resource Development, Govt. of India, for providing me financial assistance during my research tenure.

I am also thankful to Convener DPGC, Prof. Rajesh Kumar, previous Conveners Prof. A.P. Harsha, Prof. K.S. Tripathi, Prof. Sandeep Kumar and all respected DPGC members for their kind support.

I express my sincere thanks to the technical and office staff, especially Mr. S.P. Singh, Mr. Dinesh Kumar, Mr. J.K. Sinha, Mr. Akash Mishra, who helped me in various ways during this research work. I would like to thank all other people who have provided a truly conductive environment to successfully carry out this research. I shall be failing in my duty if I do not put on record my sincere appreciation and thankfulness to my seniors, lab mates and friends; Mr. Ambuj Sharma, Mr. Bharat S. Patel, Mr. Khemraj Sahu, Mr. Avinash Ravi Raja, Mr. Pushkar Jha, Mr. Rajeev Nayan Gupta, Mr. Manvandra K. Singh, Mr Parshant Kumar, Mr. Ankit Sharma, Mr. Sunil Kumar, Mr. Harish Babu, Mr. Gaurav Gugliyani, Mr. Arun Kumar, Mr. Ashish Srivastava, Mr. Ravindra Prasad, Mr. Vivek Gupta, Mrs. Prerna Mishra, Mr.Ashish Pareta. Mr. Hemant Nutiyal, Mr. Sooraj rawat, Mr. Homendra Kumar, Mr. Hemant Chaudhary, Mr. Amod Kashyap, Mr. Yash Mittal. My special thanks go to Mrs. Amrita Khan, for her help, spiritual values, and for providing me a family like atmosphere.

I have no words to express my indebtedness and gratitude to my parents, Mrs. Asha and Mr. Satendra Kumar for showering their affectionate love and all possible support during my research-endeavour. They have been a guiding force all through my life, and I could always try to measure up to their expectations. I further express my sincere thanks to my elder brothers, Mr. Sachin Singh and Dr. Prashant Singh for their constant motivation and support during all these periods and all through my life. Words at my command are not sufficient enough to express my feelings especially for my Sister Dolly Singh and for my sweet nieces Ananya, Yashi, Kashvi, nephew Subh their smiling face always rejuvenates me.

I would fail in my duty if I fail to express my deep sense of gratefulness and thankfulness to my love Chetna, for being a constant source of love, energy and ecstasy to make each day of my life brimmed with a wonderfully pleasant experience.

To all these people and to those unmentioned, my heartfel	t thanks.
---	-----------

Shushant Singh