

## **ACKNOWLEDGEMENT**

---

---

The author is pleased to express his sincere thanks and gratitude beyond words to his supervisor Prof. Rajnesh Tyagi and co-supervisors, Dr. Om Prakash Khatri and Dr. Uppu Srinivas Rao for their consistent help, encouragement and valuable discussions during the entire period of his research work. The author would not have been able to complete the thesis without their utmost involvement and invaluable efforts. They motivated the author to pursue research problems and the need for persistent effort to accomplish the goal. The author is truly indebted to them. Besides supervisors, the author would like to thank his RPEC members, Prof. Vinay Kumar Singh and Dr. Rakesh Kumar Gautam for their insightful comments and encouragement. The author acknowledges his deep sense of gratitude to the current and former Heads of the Department of Mechanical Engineering for providing all the research facilities to accomplish his research in the Department successfully. The author has an immense sense of gratitude to all the faculty members of the Department of Mechanical Engineering, IIT (BHU), Varanasi for their cooperation and inspiration. The author feels very delighted to express his sense of gratitude to Prof. Sunil Mohan (Metallurgical Engineering Department) for his technical advice and kind support. The author is highly obliged and wishes to express his sincere thanks to Dr. Om Prakash Khatri (Indian Institute of Petroleum, CSIR) for allowing him to work in the Tribology Laboratory, IIP Dehradun as a non-degree student. The author also wishes to record his sincere thanks to Ms. Sangita Kumari for lending the continuous support during his work in IIP. The author is also thankful to all his friends, lab and office staff of the Indian IIP. The author is grateful to all his friends Mr. Sudesh Singh, Mr. Gaurav Gugliani, Mr. Sushil Yadav, Mr. Rabindra Prasad, Mr. Ashish Pareta, Mr. Akash Awale, Mr. Ashwani Ranjan, Mr. Sanjay Gupta, Ms. Pooja Verma, Mr. Nitish Mahto,

Km Shafali, Mr. Siddharth Yadav, Mr. Ankitendran Mishra, Mr. Adarsh Kumar and seniors especially Dr. Pushkar Jha, Dr. Manvendra Singh, Dr. Prashant Kumar, Mr. Manish Kumar, and Mr. Rohit Kumar Singh Gautam for their constant encouragement, making joyful and memorable life being with him in moments of happiness and difficulties at IIT (BHU), Varanasi. The author is also thankful to all the lab and office staff of the department, especially Mr. Vijay Pratap Srivastava (CAM lab). The author would also like to express his immense gratitude to his parents Smt. Late Anita Nautiyal and Shri Om Prakash Nautiyal, brother Bhrigu Nautiyal, wife Mainka Nautiyal and his daughter Ms. Akshani Nautiyal for their unconditional support and encouragement to pursue his interest. The author also wishes to thank all those who have helped in any manner during the course of his research work. At last thanks to the almighty God who has given the author spiritual support and courage to carry out this work.

**(HEMANT NAUTIYAL)**