ACKNOWLEDGEMENTS

I have not traveled in a vacuum in this journey. Interdependence is certainly more valuable than independence. There are some people who made this journey easier with words of encouragement and more intellectually satisfying by offering different places to look to expand my theories and ideas. It is a pleasant aspect that I have now the opportunity to express my gratefulness for all of them.

The first person I would like to pay my sincere gratitude and thanks to my supervisor Dr. V. Pandurangadu, Retd. Rector and Professor of Mechanical Engineering, Jawaharlal Nehru Technological University, Anantapur, Ananthapuram, who offered his continuous guidance and moral support. I owe him lots of gratefulness for shown this way of research. I could not have imagined having a better advisor and mentor for my Ph.D, and without his knowledge, perceptiveness and cracking-of-the-whip I would never have finished. In addition, he was highly co-operative always accessible and willing to help students with his valuable solutions for all the problems at crucial solutions in the process of research work.

I am deeply indebted to Prof. K. Rajagopal, (i/c) Vice Chancellor, JNTUA, Ananthapuram, Prof. K. Ramanaidu, Director of Evaluation, Jawaharlal Nehru Technological University Anantapur, Ananthapuram & Prof. S. V. Satyanarayana, Director, Research and Development, JNTUA, Ananthapuram, for their encouragement, suggestions and co-operation which really help me in this research. Also I express my sincere thanks to staff members of R&D, Jawaharlal Nehru Technological University Anantapur, Ananthapuram, for their kind co-operation in execution of this work.

I express my sincere thanks to Prof. B. Durga Prasad, Head of the Mechanical Engineering Department, JNTUA College of Engineering, Prof. K. Prahlada Rao, Principal, JNTUA College of Engineering, and Dr. K. Hemachandra Reddy, Professor, Department of Mechanical Engineering, JNTUA College of Engineering, Ananthapuram for their moral support and encouragement.

It would be a great privilege to express my gratitude to Prof. P. Usha Sri, Head of the Mechanical Engineering Department, Univ. College of Engg. Osmania University, Hyderabad, in spending her valuable time for giving her valuable suggestions, direction, and encouragement to complete thesis of my research work.

It would be a great privilege to express my gratitude to Dr. V. Naga Prasad Naidu, Professor & Principal, Department of Mechanical Engineering Intell Engineering College, Anantapur, Dr. R. Rama Chandra, Professor & Principal,
Department of Mechanical Engineering SKD Engineering College, Gooty and Dr. B. Balakrishna, Professor, Department of Mechanical Engineering JNTUK College Engineering, Kakinada in spending their valuable time for giving their valuable suggestions, direction, and encouragement to complete thesis of my research work.

It would be a great privilege to express my gratitude to Dr. G.P. Prasada Reddy, Professor & In charge of Examinations, Department of Mechanical Engineering, G. Narayanamma Institute of Technology and Science (for women), Hyderabad in spending his valuable time for giving his valuable suggestions, direction, and encouragement to complete thesis of my research work.

I express my sincere thanks to Dr. K. Ramesh Reddy, Professor & Principal, G. Narayanamma Institute of Technology and Science (GNITS) for extending for his co-operation and help in completing this research work and also I express my sincere thanks to Mr. P. Subba Reddy, Chairman, & Smt. G. Srividya, secretary, G. Narayanamma Institute of Technology and Science (GNITS), for their encouragement and help during the execution of this work and for extending necessary institutional help for the research work.

I express my sincere gratitude to Smt. V. Saraladevi Pandurangadu for her encouragement, cooperation and support during my research work.

I express my sincere thanks to Mr. M. Venkata Ramana Reddy, Head of Department & Associate Professor, GNITS, Hyderabad, for his co-operation and help in carrying out the research work. Also I express my sincere thanks to all my colleagues Mr. Ch. Mohana Rao, Mr. S.N.S.Reddy, Miss.N. Hiranmai, & D. Tirupathaiah, Assistant Professors, Department of Mechanical Engineering, GNITS, Hyderabad, for their encouragement and help during the execution of this work.

I express my sincere thanks to all the persons who had extended their help directly and indirectly in completing this research work.

I am grateful to my parents and my family members for their affection, steady support and encouragement throughout my career.

It is my pleasure to mention the valuable contribution of my better half, Smt. M. Lakshmi Devi and my children Chi. M. Chandana, M. Nihar Naik and M. Niharika for motivating me with their moral support and dedication in carrying out this work.

Finally I extend my sincere thanks to all my friends and colleagues, who have been associated directly and indirectly with my research work.

S.MADDULETY SWAMY