ACKNOWLEDGEMENT

I would like to express my deepest sense of gratitude to my research supervisor Dr. R. Velraj, Professor, Department of Mechanical Engineering, College of Engineering, Guindy, Anna University, Chennai- 600025, for the intellectual guidance, spacious inputs, invaluable suggestions, and invariable encouragement. Without his constant motivation, technical mentoring, and invaluable help provided to me during my research, it would have definitely not been possible for me to complete my research and shape out my dissertation.

I am indebted to my doctoral committee members, Dr. P. V. Vaidyanathan, Former Vice Chancellor, Annamalai University, Chidambaram - 608002 and Dr. N.V. Mahalakshmi, Professor, Department of Mechanical Engineering, College of Engineering, Guindy, Anna University, Chennai - 600025, for their judicious denunciation, constructive comments and valuable suggestions.

I express my enormous gratitude to Dr. B. Mohan, Professor and Head, Department of Mechanical Engineering, Anna University, Chennai- 600025, for extending the facilities of the department to carry out the research work.

I am speechless and I can’t express my gratitude to my Mother in words, whose unconditional love has been my greatest strength. I can hardly find the words to express all the wisdom, love, and support she has given me. She will always and will ever remain as compass of my whole life.

GOPINATH, A