ACKNOWLEDGEMENTS

There is no way that I would be where I am today without the help and encouragement of a lot of people along the way. I would like to express my sincere gratitude to Lord Shiva for giving me the opportunity to complete the writing of this thesis. I would like to thank my parents Mr. Gulab Prasad Tiwari and Mrs. Vinod Kumari Tiwari for all the support they have given me. They let me explore, be curious and always did whatever they could to put me in the best position to succeed. I am forever grateful to them. I would also like to thank my brother Mr. Kamlesh Kumar Tiwari who was always giving me his love and supporting that I needed.

I am heartily thankful to my supervisors, Dr. Santosh M. Bobade, Assistant Professor, Department of Physics, Jaypee University of Engineering & Technology, Guna, India, and Dr. Sarang Pande, Professor, Department of Mechanical Engineering, Marwadi Education Foundations Group of Institutions, Rajkot, India, for their valued supervision, advice, availability, support and encouragement enabled this thesis to be written and will always be deeply appreciated. It has truly been a pleasure working with each of you. Dr. Sarang Pande was never afraid to challenge and guide me throughout this process. Both supervisors always put their students first and would not hesitate to go out of their way to mentor and help them in any way that they could.

I would also like to mention Dr. Prakash Gopalan, Professor, Metallurgical Engineering and Material Science, IIT, Bombay, for his support along the way. Special thanks go to Dr. Jayant Kolte, Dr. Atish Dariyapurkar for their constant assistance through technical help, endless discussion and unquestionable support during my experimental work at IIT, Bombay.

I would also like to thanks, Mrs. Subha Jayaraman, Head of Material Testing Division, Central Institute of Plastic Engineering, Bhopal, India, for her support.
To all colleagues and friends at the Mechanical Engineering, I would like to express my gratitude for their patience and continuous support. I would deeply thank Mr. Raju Arya for his constant assistance. Also, my thanks go to Dr. Sanat Agrawal.

Lastly, I also express my sincere thanks to all of those who supported me in any respect during the completion of the research.

(Sunil Kumar Tiwari)

(Er. No.-11P3502)