

## ACKNOWLEDGEMENT

I wish to express my deep sense of gratitude to Dr. Srikumar Mukherjee, Senior Lecturer, Department of Mathematics, Malda College, Malda, for his valuable guidance and continuous help throughout the preparation of this thesis.

I am greatly indebted to Dr(Mrs) Swapna Mukherjee, Senior Lecturer, department of Mathematics, Raiganj University College, Raiganj, for her suggestion and encouragement during my research work. I wish to thank Dr D K Nanda for his help in presentation of the thesis.

I owe my sincere thanks to Calcutta Port Trust, Calcutta for giving the permission to carry out my research work. I am thankful to the University of North Bengal, Darjeeling for allowing me to submit my thesis.

I would like to thank my wife Mrs Alpana Mandal for her interest in my work and making valuable time available to me with her constant cooperation. Thanks are also due to my daughter 'Gunjan' whose being accommodative during the long hours of my absence has resolved many of my problems.



(Gopal Chandra Mandal)

Assistant Scientific officer,  
Hydraulic Study Department,  
Calcutta Port Trust,  
20, Garden Reach Road,  
Calcutta, India - 700 043