ACKNOWLEDGEMENT

I take this opportunity to express my deep sense of gratitude and indebtedness to my esteemed supervisor **Dr. Jyoti Prasad Chakraborty**, and **Prof. Monoj Kumar Mondal** who helped enormously and always inspired me by their indispensable guidance and encouragement during the whole dissertation work. They always supported and strengthened me in many direct and indirect ways.

I am highly grateful to **Prof. V. L. Yadav**, Professor, Department of Chemical Engineering and Technology, Indian Institute of Technology, Banaras Hindu University, for providing necessary facilities and encouragement during the research work.

I express my sincere thanks to all DPGC and RPEC members for their direct or indirect motivation and assistance from different corners during my research work at institute. Further, I would like to thank **Mr. Vinay Kumar** of Chemical Engineering Department, for providing me valuable support and encouragement during the research work.

Also I express my sincere thanks to all faculty members of the Department of Chemical Engineering and Technology, Indian Institute of technology, Banaras Hindu University for their help during the research work. I am very thankful to all technical and non-technical staff of Department of Chemical Engineering & Technology, Indian Institute of technology, Banaras Hindu University.

I feel loss of words to express my most heartfelt and cordial thanks to my friends Ms. Bineeta Singh, Mr. Shobhit dixit, Mr. Sudhakar Saroj, Mr. Anuj Kumar Prajapati, Mr. Rishikesh Kumar Singh, Mr. Devesh Kumar Srivastava, Mr. Goutam Kishore Gupta, Mr. Pramendra Gaurh, Mr. Deoashish Panjiara and Ms. Zeenat Arif

who have always been a source of inspiration for me and who stood by my side at the toughest times.

The whole credit of my achievements goes to my father Late Mr. Giraja Shankar Singh, mother Smt. Vanshraji Devi, and brother Amrit Kumar Singh who were always there for me in my difficulties. It was their unshakable faith in me that has always helped me to proceed further.

Finally I wish to extend a warm thank all those who could not find a separate name but have helped directly and indirectly.

Date:

Varanasi (Satyansh Singh)