

ACKNOWLEDGMENT

I would like to express my highest gratitude to my research supervisors Professor Aarif Jamal for their guidance and continuous cooperation in carrying out this thesis. Furthermore, their stimulating encouragement and precious suggestions instrumented my vision to finalize the shape of this work and allowed me to accomplish the research work independently. I consider myself fortunate to have the opportunity to work under his excellent guidance.

At the outset, I express my deep sense of gratitude to Professor Piyush Rai, Head, Department of Mining Engineering, IIT (BHU), Varanasi for providing me with all the necessary facilities and support required for research work.

I am thankful to my Research Progress Evaluation Committee (RPEC) members Professor Om Prakash Sinha and Professor Netai Chandra Karmakar for their cooperation and giving suggestions in improvement of my research work.

I am really grateful for all faculty and supporting staff of the Department of Mining Engineering, IIT (BHU) and other organization helped me in my research work such as Department of Chemical Engineering & Technology, IIT (BHU), Varanasi; Central Instrument Facility, IIT (BHU), Varanasi; Northern Coalfield Limited, Singrauli; Interdisciplinary School of Life Sciences, BHU, Varanasi.

I am greatly indebted to my parents Mr. Mashkur Alam Ansari and Mrs. Shahida Ashrin and family members who has supported and encouraged me throughout this endeavor: Thank you for your love and support throughout my life and helping me realize who I am today. I would especially thank my friend Mr. Akhilesh Kumar Yadav for not only his help through my work but also making this journey unforgettable.

Last but not the least; I thank the Almighty God for his blessings without which this research could not be achieved.

Date:

Place: Varanasi

(Saba Shirin)