

DECLARATION BY THE CANDIDATE

I, *NARENDRA KUMAR* certify that the work embodied in this thesis is my own bona fide work and carried out by me under the supervision of *PROF. SUNIL MOHAN & Dr. R.K. GAUTAM* from *OCTOBER 2012* to *APRIL 2016*, at the *DEPARTMENT OF METALLURGICAL ENGINEERING*, Indian Institute of Technology, Varanasi. The matter embodied in this thesis has not been submitted for the award of any other degree/diploma. I declare that I have faithfully acknowledged and given credits to the research workers wherever their works have been cited in my work in this thesis. I further declare that I have not wilfully copied any other's work, paragraphs, text, data, results, etc., reported in journals, books, magazines, reports dissertations, theses, etc., or available at websites and have not included them in this thesis and have not cited as my own work.

Date:

Place: Varanasi

(*NARENDRA KUMAR*)

CERTIFICATE BY THE SUPERVISOR(S)

It is certified that the above statement made by the student is correct to the best of my/our knowledge.

Prof. Sunil Mohan
Supervisor
Department of Metallurgical Engineering
IIT (BHU), Varanasi - 221005

Dr. R.K. Gautam
Co-Supervisor
Department of Mechanical Engineering
IIT (BHU), Varanasi - 221005

Head
Department of Metallurgical Engineering
Indian Institute of Technology (Banaras Hindu University)
Varanasi - 221005