

CANDIDATE'S DECLARATION

I, **Pradipta Kumar Jena**, certify that the work embodied in the present thesis is my own work carried out by me under the supervision of **Professor R. K. Mandal, Dr. K. Siva Kumar** and **Dr. A. K. Singh** for a period of six years and eleven months from **January 2011** to **December 2017** at the Department of Metallurgical Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi. The matter embodied in the thesis has not been submitted for the award of any other degree or diploma.

I declare that I have faithfully acknowledged, given credit to and referred to the research workers wherever their works have been cited in the text and the body of the thesis. I further certify that I have not willfully lifted up some other's work, paragraph, text, data, observations etc. reported in the journals, books, magazines, reports, dissertations, theses, etc. or available at web and included them in the present thesis by citing the same as my own work.

Date:

Place: Varanasi

(Pradipta Kumar Jena)