

CANDIDATE'S DECLARATION

I, **Ashish Kumar Pandey**, certify that the work embodied in this Ph. D. thesis is my own confide work carried out by me under the supervision of **Prof. K K Srivastava** and the co-supervision of Prof. **P K Mishra** for a period of 4 year 10 months from September 2011 to June 2016 at Department of Chemical Engineering & Technology, IIT (BHU), Varanasi, India. The matter embodied in this Ph. D. thesis has not been submitted for the award of any other degree/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, results, etc. reported in the journals, books, magazines, reports, dissertations, theses, etc., or available at web-sites and included them in this Ph. D. thesis and cited as my own work.

Date:

Place: Varanasi

(Ashish Kumar Pandey)

CERTIFICATE FROM THE SUPERVISOR

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

(Prof. P K Mishra)

Co-supervisor

(Prof. K K Srivastava)

Supervisor

Head of the Department