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It is certified that the work contained in the thesis titled **“To study the effect of bubble properties on gas liquid mass transfer in bubble column”** by **“Neha Agarwal”** has been carried out under my supervision and this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of Comprehensive Examination, Candidacy and SOTA for the award of Ph.D. Degree.

**(Prof. Ashok Kumar Verma)**

Supervisor

#### DECLARATION BY THE CANDIDATE

I, “**Neha Agarwal**”, certify that the work embodied in this thesis is my own bonafide work and carried out by me under the supervision of “**Prof. Ashok Kumar Verma**” from “**December 2013**” to “**October 2019**”, at the Department of “**Chemical Engineering & Technology**”, **Indian Institute of Technology (BHU), 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 willfully 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:

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(**Neha Agarwal**)

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#### CERTIFICATE FROM THE SUPERVISOR(S)

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

(**Prof. Ashok Kumar Verma**)

Supervisor

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