



## DECLARATION BY THE CANDIDATE

I, “**Mr. Sakendra Kumar**”, (Roll No. 12606EN008), certify that the work embodied in this thesis is my own bona fide work and carried out by me under the supervision of “**Prof. Satya Prakash Tewari**” from **2012 to 2017**, at the “**Department of Mechanical 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 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:  
Place: Varanasi

Signature of the Student  
(Sakendra Kumar)

## CERTIFICATE BY THE SUPERVISOR

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

**Supervisor**  
(Dr. Satya Prakash Tewari)  
Professor  
Department of Mechanical Engineering  
Indian Institute of Technology (Banaras  
Hindu University)  
Varanasi (U.P.)-221005

**Signature of Head of Department**