

## **DECLARATION BY THE CANDIDATE**

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I, **Shushant Singh**, certify that the work embodied in this thesis is my own bonafide work and carried out by me under the supervisions of **Dr. Debashis Khan** and **Prof. S.K. Panda** from July 2013 to July 2018, at the Department of Mechanical Engineering, 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 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:** IIT (BHU) Varanasi

**(Shushant Singh)**

## **CERTIFICATE BY THE SUPERVISORS**

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

**Dr. Debashis Khan**  
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