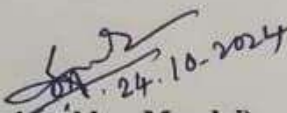


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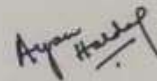
  
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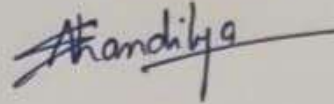
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I, "Amarendra Nath Shandilya" certify that the work embodied in this thesis is my own bonafide work and carried out by me under the supervision of "Prof. Sasankasekhar Mandal and Dr. Ayan Haldar", from "August 2019 to October 2024", at the "Department of Civil 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.

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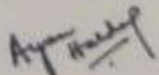
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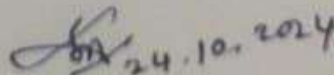
This is to certify that the above statement made by the candidate is correct to the best of my knowledge.



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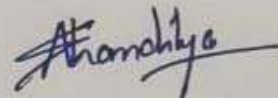
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**Amarendra Nath Shandilya**