Declaration by the Student

I hereby declare that the project work presented in this report entitled ***"Bifurcation Analysis and Lyapunov Exponent Spectrum for a modified Van Der Pol heart model"*** submitted in partial fulfilment for the award of the degree of Master of Technology in Electronics Design and Technology, Department of Electronics and Communication Engineering during the academic year 2020-2021, has been carried out by me and that it has not been submitted in part or whole to any institution for the award of any other degree or diploma.

Date: (Yaheya Al Aman)

Place: ECD20026

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CERTIFICATE

This is to certify that the dissertation entitled **"Bifurcation Analysis and Lyapunov Exponent Spectrum for a modified Van Der Pol heart model"** submitted to the Department of Electronics and Communication Engineering, Tezpur University in partial fulfilment for the award of the degree of Master of Technology in Electronics Design and Technology, is a record of project work carried out by **Mr. Yaheya Al Aman (ECD20026)** under my supervision during the period from August 2021 to June 2022. All support received by him from various sources have been duly acknowledged. No part of this dissertation has been submitted elsewhere for the award of any other degree or diploma.

Date: **(Dr. Ratul Kumar Baruah)**

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CERTIFICATE

This is to certify that the dissertation entitled *"Bifurcation Analysis and Lyapunov Exponent Spectrum for a modified Van Der Pol heart model"* is a bonafide record of project work carried out by *Mr. Yaheya Al Aman (ECD20026)* and submitted in partial fulfilment for the award of the degree of Master of Technology in Electronics Design and Technology, Department of Electronics and Communication Engineering during the academic year 2020-2022. He has carried out his project work under the supervision of *Dr. Ratul Kumar Baruah, Associate Professor Department of Electronics and Communication Engineering, Tezpur University.*

This approval does not necessarily endorse or accept every statement made, opinion expressed or conclusion drawn as recorded in the dissertation. It only signifies the acceptance of this dissertation for the purpose for which it is submitted.

Date:

Place: (Dr. Santanu Sharma)

Certificate by the Examiner

This is to certify that the dissertation entitled *"Bifurcation Analysis and Lyapunov Exponent Spectrum for a modified Van Der Pol heart model"* submitted by *Yaheya Al Aman (ECD20026)* in partial fulfilment of the requirements for the degree of Master of Technology in Electronics Design and Technology, Department of Electronics and Communication Engineering has been examined by me and is found satisfactory for the award of the degree.

This approval does not necessarily endorse or accept every statement made, opinion expressed or conclusion drawn as recorded in the dissertation. It only signifies the acceptance of this dissertation for the purpose for which it is submitted.

Date:

Place: (Examiner)