CONTENTS

VALIDITY SHEET ..... **ii**
ABSTRACT ..... **ii**
FOREWORD ..... **iii**
WORDS OF THANKS ..... **iv**
CONTENTS ..... **v**
LIST OF FIGURES ..... **vii**
LIST OF FIGURES ..... **ix**
CHAPTER I INTRODUCTION **1**
1.1. Background 1
1.2. Problem Formulation 2
1.3. Objectives and Benefits 2
1.4. Problem Limitation 2
1.5. Research Methods 3
1.6. Implementation Schedule 4
CHAPTER II LITERATURE REVIEW **5**
2.1. Solution Concept Design 5
2.2. Previous research 6
2.3. Battery Management System 8
2.3.1. Battery Capacity Balancing Passive Method 8
2.3.2. Battery Capacity Balancing Active Method 9
2.4. Internet of Things 10
2.4.1. IoT Architecture 11
2.4.2. HTTP Protocol 12
2.4.3. Antares Platform 12
2.5. Battery 13
2.5.1. Battery Performance Parameters 14
2.5.2. Lithium Polymer Battery 14
2.5.3. Lithium Polymer Battery Charging Methode 15
CHAPTER III SYSTEM PLANNING **16**

3.1. Design System 16
3.1.1. Block Diagram 17
3.1.2. Functions and Features 18
3.2. Hardware design 18
3.2.1. Electrical design 18
3.2.2. Component Spesification 20
3.3. Software Design 27
3.3.1. BMS Software Design 27
3.3.2. IoT Software Design 29
CHAPTER IV 31
RESULTS AND ANALYSIS 31
4.1. System Design Results 31
4.2. System Test Results 32
4.2.1. Voltage Value Accuracy Test Results 33
4.2.2. Balancing Efficiency Test Results 35
4.3. Communication Test 43
4.3.3. Package Loss Test 43
4.3.3. Testing of Data Delivery Delays to Antares 43
CHAPTER V 44
CONCLUSION AND SUGESTION 44
5.1 Conclusion 44
5.2 Sugestion 45
BIBLIOGRAPHY 45
ATTACHMENT 47