DJJ50193: PROJECT 2 PROPOSAL

(MOISTURIZER SPRINKLE)

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This report is submitted to the Department of Mechanical Engineering in partial fulfilment of the requirements for Diploma in Mechanical Engineering

MECHANICAL ENGINEERING DEPARTMENT

SESSION 1: 2021/2022

DECLARATION OF ORIGINAL WORK AND INTELLECTUAL PROPERTIES

TITLE : MOISTURIZER SPRINKLER

SESSION : 1:2021/2022

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2. I acknowledge that the 'Project above' and its intellectual property are the original work/copy of our work without taking or imitating any intellectual property from others.
3. I agree to give up the intellectual property ownership of 'The Project' to the Polytechnic in order to meet the requirements for awarding us **Diploma in Mechanical Engineering.**

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as the project supervisor on the date: ……

ACKNOWLEDGEMENT

Assalamualaikum and good day to you,

All praise to Allah who bestowed us with strength, will, guidance and perseverance to complete this final project. We have learnt things about ourselves along this journey completing this project and we have come away with newfound interest, skill and strength. Not only we have acquired new skills and gained valuable knowledge but we have also learnt making more connections and meeting new friends for which we are honoured to be part of the journey.

We would like to express our appreciations and heartfelt thank you to both of our parents who have given their blessings, love, supports and encouragement for us to keep going and growing in life. Many sincere thanks also goes to our siblings, our brother and sisters for their assistance and continuous support.

Our heartfelt thanks also go to Puan Salhana Binti Sahidin@Salehudin, our supervisor for his patience guidance, knowledge, dedication and advice for without his supervisory we will not be able to complete this project. No word can describe how much the success of this project mean to us and May Allah grant you barakah and continue success in this life and hereafter.

We would also like to take this opportunity to extend our thanks to my fellow classmate for the sharing of knowledge, valuable support, guidance, assistance for these past six month.

ABSTRACT

This project is focusing on how to make life easy for people when watering the plant. Usual conventional way of watering the plant manual will take longer time to finish the watering the plant as well as consuming a lot of energy. For that, the group came up with an innovative idea on how to make watering the plant easy which is called “Moisturizer Sprinkler”. This “Moisturizer Sprinkler” can water the plant automatically with the use of timer. This sprinkler consists of many components such water pump, temperature sensor, soil moisture sensor, pipe, sprinkler, relay and Arduino uno board. The use of soil moisture sensor is to detect the temperature in the soil and the data from the sensor is being processed and send to the temperature sensor. From the temperature sensor the data is sent to Arduino uno board. At this point, it will trigger the water pump to supply the water to the plant through the pipe. With the “Moisturizer Sprinkler” machine, the process for watering the plant can be done much faster by using less energy. The whole process will enable effective water usage in watering plant which help to avoid water wastage. In the long run, the usage of the innovative sprinkler will reduce the cost of production and making the production more systematic which eventually give positive impact to the agriculture industry.

Keyword : Sprinkler

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Watering the plant is that the most vital cultural practice and one among the labors intensive tasks in daily greenhouse operation. Watering systems ease the burden of getting water to plants once they need it. Knowing when and the way much to water is 2 important aspects of watering process. to form the gardener works easily, the automated plant watering system is made. There have a various type using automatic watering system that are by using system, tube, nozzles and other. this technique uses watering system because it can water the plants located within the pots

1.2 Research Background

Soil moisture is that the water stored within the soil and is suffering from precipitation, temperature, soil characteristics, and more. These same factors help determine the sort of biome present, and therefore the suitability of land for growing crops.()

With the current situation of covid pandemic, many industry have face many problem in the economy industry such as the main focus for this project which is farming industry. Many farmers struggle with their daily life because they need to follow their new lifestyle that the government have given to them such as :-

i. To follow the new SOP
ii. There must always wear a face mask to work
iii. The unpredictable weather in the country

The reason why we want to do this project is because we want to make it easier for the famers that in the farming industry to do their work in this difficult situation. So that we want to ease their burden in their work that always expose to extreme climaxes and unpredictable weather in our country.

1.3 Problem Statement

A problem statement is a concise description of an issue to be addressed or a condition to be improved upon. It identifies the gap between the current (problem) state and desired (goal) state of a process or product.

In the process of watering the plant, there are some user in the still uses the traditional and the old way. In addition, some user also uses the machine to help them but instead uses to much money. Therefore, its causes the user face some of the following problems which are :

i. The traditional coconut peeler can be dangerous
ii. The traditional and the old way uses a lot of energy.
iii. When watering the plant in traditional and old way is taken a long time.

1.4 Research Gap

The unique of our product compare to the other product that have been in the market is that we use soil moisture sensor to the detect the temperature of the soil so that it can be determine whether the soil is dry or wet. This product use a high technology that can be use by the farmer and the small industries to collect the data from the soil sensor to determine the soil is in good condition and can be use to improve the fertilizer to increase the quality of the production.

1.5 Research Objectives

In this project, there are many objectives that can be achieve and it can also solve some of the problem for the farmers in the farming industry. Objectives are basic tools that underlie all planning and strategies activities. Below are the objectives for the project.

i. To design an automated watering plant tool.
ii. To develop and fabricate an automated watering plant tool.
iii. To minimise watering time

1.6 Significance of study

This significance of study is very importance to us for the project. Because we can know what is the lack for watering the plant while using manual work and it can make us see what is objective that we need to achieve. Next, we can learn new knowledge from article, report and many more. The benefit that we can get from this study:

i. It can make the people think how to think how to be creative
ii. It can help the people to solve more problem
iii. We can expense our knowledge

1.7 Scope and limitations

The scope or limit of the project as a reference is made to ensure that the project is reached. The scope of the objectives or goals set for the project.

Scope for the project:

i. Only for small business
ii. Only for farmer
iii. There is a specific range that the sensor can sense.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Watering the plant is the most important activity in gardening on a day-to-day basis. Regardless of the weather, everyone wants to be able to control the amount of water that gets to the plant. The “Moisturizer Sprinkle” checks the moisture content of plants twice a day, and if it is below the intended value, a particular amount of water is delivered until it reaches the intended value.

2.2 Theory/Concept

Sprinklers are irrigation devices that are used to irrigate crops, lawns, landscapes, golf courses, and other locations. Sprinkler also is a technique for administering water in a controlled manner, much like rainfall. Water is distributed by a network that may include pumps, valves, pipes, and sprinklers.[1] The portable sprinkle connected with water pump controlled with UNO Arduino board and moisture sensor to deliver particular amount of water for plant. Sprinkle sense with moisture sensor to give enough water for plant in 10 meters. This can assist gardeners or farmers in completing their regular tasks more quickly.

2.3 Existing concepts

Sprinklers can be utilised in a variety of settings, including residential, industrial, and agricultural. Sprinkle also use in automatic watering in agriculture. But it is not efficient because used timer and still work in rainy day. It is can effect moisture of soil and plant can damage to give plant yield. Sprinkle in automated watering is commonly used by small farmers since it is inexpensive, easy to maintain, and efficient due to its simple functioning system. While the “Moisturizer Sprinkle” arranged with appropriate soil moisture without push button n timer. It also minimises the workload for farmers and the time it takes to watering plant in sunny day.

2.3.1 Concept 1

Sprayer that can squirt, spray or mist fluids. A common use for spray bottles is dispensing in agriculture for watering. The advantage of sprayer is can watering in wide dimension. Disadvantages it is work under pressure when pushing the sprayer. It shows in the figure 2.1:

Figure 2.3.1 Water sprayer

2.3.2 Concept 2

A water timer is an electromechanical device that, when placed on a water line, increases or decreases the water flow through the use of an electro-mechanically actuated ball valve or embedded (solenoid) valve. The advantage of watering timer is watering in set time and automatically on and off. Disadvantages which is still running on rainy days at set times. It shows in the figure 2.2:

Figure 2.3.2 Watering timer

CHAPTER 3
METHODOLOGY

3.1 Introduction

In the project methodology it is a major study to determine that the project can run smoothly, it can also be completed in the alloted time.Figure 3.1 shows the research methodology use in this project.

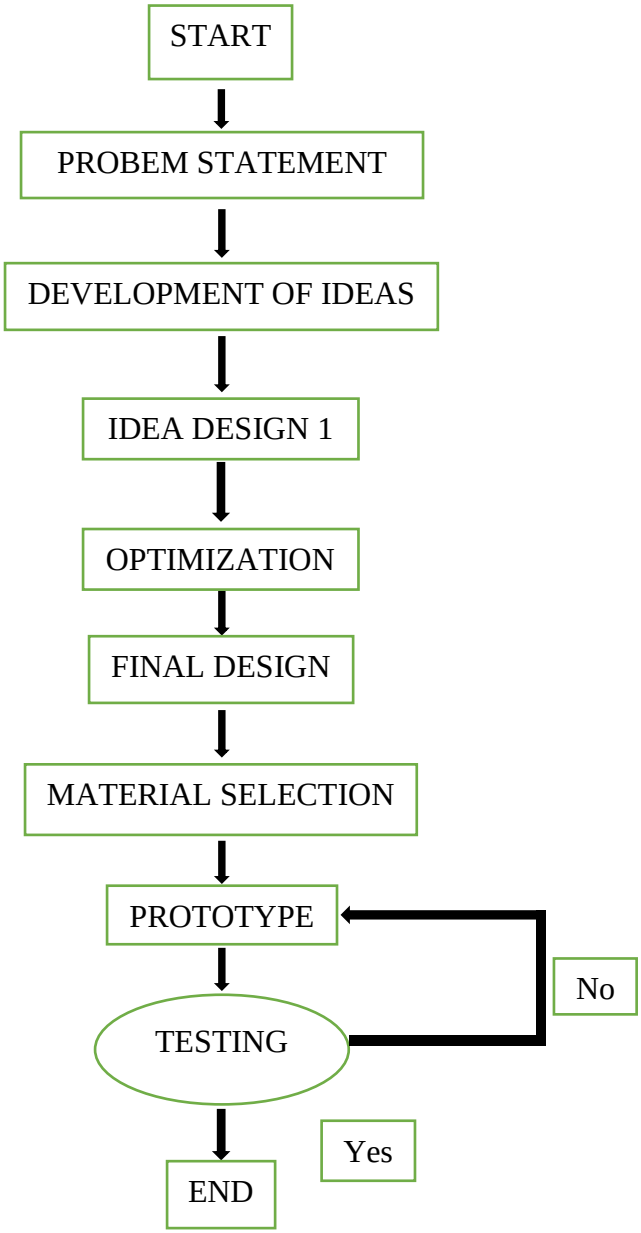


Figure 3.1 Research methodology

3.1.1 Concept Selection

The first stage in this methodology is the selection of the concepts.Subjects needed to innovate on something in order to be better and useful for the future.The title and project of choice is a MOISTURIZER SPRINKLER.Once the topic was selected, a discussion was held with the supervisor and everything would run successfully.

3.1.2 Literature Review

This research was conducted to find theory and concept of the project.This information is referenced from the research of others who are very helpful in inspiring to develop the material into reality.based on references taken from the website,there is some information on moisturizing sprinklers that give ‘fruit to the mind’ and‘ eye-popping’.

3.1.3 Material Purchase

Purchase of materials by the equipment needed to work on the project until it is completed and successful.There are several examples of materials needed to work on this project,namely soil moisture sensors,temperature sensors,pipelines and adhesive tape. Basically, the pipeline is connected to an iron pipehead or plastic. Then, the soil moisture sensor is piled into the soil,while the temperature sensor is wrapped in adhesive tape neatly.

3.1.4 Fabrication

In this process each material that has been obtained will be assembled according to appropriate methods such as soldering, assembling, welding, cutting and wrapping.

3.1.5 Test run

After completing the wire soldering method between the soil moisture sensor and the temperature sensor as well as the wire connection on the arduino uno board , then cutting the pipeline according to the measurements.The watering timer was tested using a sensor system.For example, the watering timer works smoothly. That can be used and the process as above also runs smoothly.

3.2 Product design

The design of this product is about the problems that occurs if a lot of water consumption on a crop, so this product is able to reduce water consumption in crops resulting in too moist soil, then the existence of a watering timer that has a sensor to follow the schedule of water out regularly.

3.2.1 Design

This design is a distinctive design because this idea comes to mind, but not at all designs, for example the design of soil moisture sensor, temperature sensor, arduino uno board, the relay is based on the website reference.This design follows the same as the design such as water pump, relay and temperature sensor, soil moisture sensor. The figure 3.2 show the design for design:

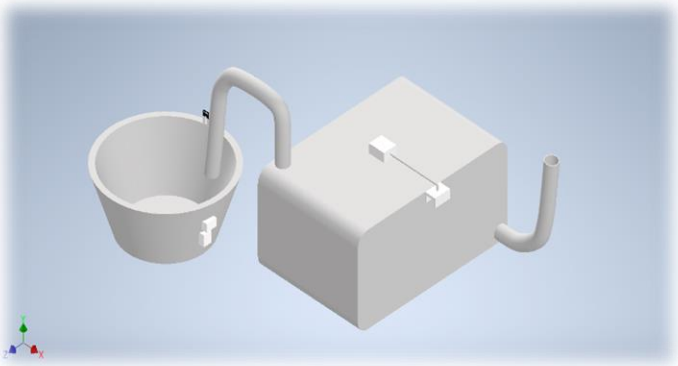


Figure 3.2.1 Design

3.2.2 Material Selection

The material that have been used in this project. The material is easy to search and buy. It is also easy to used. Here are the material:

1) Water Sprinkler

2) Water Pump

3) Soil Moisture Sensor

4) Water Hose (5meter)

5) Temperature Sensor

6) Arduino Uno Board

7) Relay

8) Jumper Wire

9) Rechargeable Battery 12V 5AH

10) Solar Panel 10W

11) Solar PWM Controller (C) 10A

12) Wire 2 meter

3.3 Analysis

This design has a variety of materials used:

1) The design that it used in this project is to make it easy for the farmer when watering the plant.

2) This project used soil moisture sensor to detect soil moisture of the plant easily.

3) This project is also run by a programming system that used Arduino uno board so that the project can work smoothly.

4) The water pump it used to flow and carry the water from the water supply to the plant.

3.4 Prototype

First,this design has its creative design and makes it easier for users to grow crops especially plants grown in pots,then this design has a positive impact on users. It shows in the figure 3

Figure 3.4: Prototype Design

3.5 Project cost

Cost is the value of money that has been used up to produce something or deliver a service and hence is not available anymore. Below shows the table of estimation cost:

NO	MATERIAL	PRICE OER UNIT	QUANTITY	TOTAL
1	Water Sprinkler	RM6.90	1	RM6.90
2	Water pump	RM19.00	1	RM19.00
3	Soil Moisture Sensor	RM3.40	1	RM3.40
4	Water Hose (5 Meter)	RM8.40	1	RM8.40
5	Temperatur e Sensor	RM14.90	1	RM14.90
6	Arduino Uno Board	RM39.40	1	RM39.40
7	Relay	RM12.20	1	RM12.20
8	Jumper Wire	RM0.10	10	RM1.00
9	Rechargeabl e Battery 12V 5AH	RM65.00	1	RM65.00
10	Solar Panel 10W	RM90.00	1	RM90.00
11	Solar PWM Controller (C) 10A	RM40.00	1	RM40.00
12	Wire (2 Meter)	RM3.00	1	RM3.00
ESTIMATION COST				RM303.20
MARKET VALUE				RM400.00

- **Table 1:** Budget of Material

3.6 MARKETING

This Moiturizer Sprinkler machine are incompatible with big company that used advance technology and system. Big industries and company of aquaculture are already have its own machine to watering the plant activities. So, our marketing will be more of all farmer that make aquaculturer activities for gaining income. Lastly, our marketing is targeted to the country side areas residents which are more tend to face with a lack of technological awareness.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Introduction of Discussion

Before undertaking a project, several things that need to be focused on in the discussion process to ensure that the project can be carried out over a given period. It also minimizes the various problems that will be encountered while completing the project.

4.1.1 Discussion

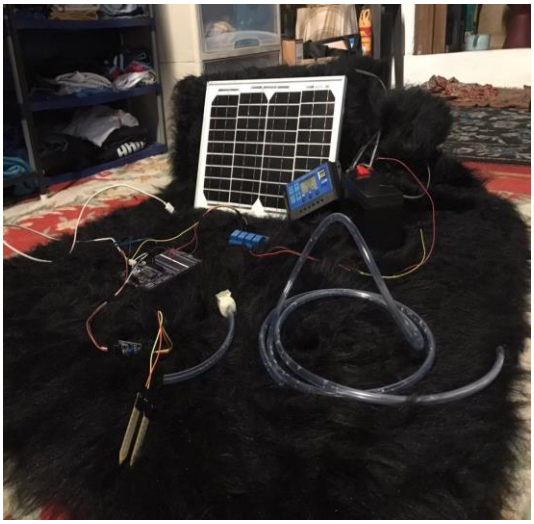
Discussions on this project include discussions between our group members and our supervisor. We talk about work schedules, work procedures, project problem statements, project objectives and more. The first discussion we had was to discuss the idea of the project to be implemented. Some ideas have been provided but only one title is required. Examples of ideas we have come up with are "mini water cooler portable" and "mini tesla". We unanimously chose the "Moisturizer Sprinkle" as our final project. This title is selected based on the capabilities and areas we have learned.

The next discussion is on the work schedule we will have throughout the project. This is to simplify our work process so that the project can be completed within a given time frame. Before starting the project. we discussed the necessary materials as well we made some sketches to get the best design. In addition, this sketch can also help you get the size you want.

Finally, we talked about the steps to complete the project and the tools to be used. Safety must also be taken into account before carrying out the work process.

4.2 End product

- Figure 4.2.1 Show the Final Result of the Moisturizer Sprinkler



- Figure 4.2.2 Show the Final Result of the Moisturizer Sprinkler

In the end, this is the final design that we will use after so many discussion thinking and many testing. Although the design isn't very organized properly but this project will detect the temperature of the soil with soil moisture sensor and the data will go to Arduino Uno Board. Then the water pump will start and the water pump will flow the water to the plant through the water pipe. This project and the system can be easily to use and it can also make for watering the plant easier.

4.3 Result and discussion

4.3.1 WATER PUMP REACT WITH TEMPERATURE

TEMPERATURE(°c)	COMPONNENT WORKING
20 and above	Water pump working
19 and below	Water pump not working

Table 2: Analysis Water Pump React with Temperature

According to table 2, we can see that the water pump will start working when the moisture sensor detect the temperature to be 20 celsius and above meanwhile when the temperature to be 19 celsius and below, the water pump will not start and work at well. We can conclude that this project use the right amount of water that the plant needed and can also prevent the people from using to much water when watering the plant.

4.3.2 FREQUENCY SOIL MOISTURE SENSOR REACT WITH WEATHER

NO	DATE	WEATHER	FREQUENCY
1	21/11/2021 (SUNDAY)	SUNNY	5
2	22/11/2021 (MONDAY)	SUNNY	7
3	23/11/2021 (TUESDAY)	RAINY	1
4	24/11/2021 (WEDNESDAY)	RAINY	0
5	25/11/2021 (THURSDAY)	SUNNY	9
6	26/11/2021 (FRIDAY)	RAINY	2
7	27/11/2021 (SATURDAY)	RAINY	0

Table 3: Frequency Soil Moisture Sensor React with Weather

According to table 3, we know that the Soil Moisture sensor always frequency react when the weather is sunny and hot while when the weather is cloudy or rainy, it has the least frequency react by the Soil Moisture Sensor. We can see from this result and conclude that this project can prevent people from water waste usage

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

Each project undertaken has its own significance and objectives. Likewise, the project we are working on is the Moisturizer Sprinkle. While there are some weaknesses identified, there are a number of ways we can overcome our project weaknesses and most importantly our objectives for implementing this project have been achieved.

5.2 Conclusion

Based on this project, we can see that it is particularly beneficial for those with small or private businesses for them to plant and grow their plant in various sizes and place. With such a project, it will be easier for the people to work and at the same time it consume less time to finish their work in their daily life.

Finally, with the creation of such a project it is hoped that it will be fully utilized, accepted and can be used by all societies and well adapted to the technological developments of this age. In addition, it is hoped that the proceeds from this project will meet the needs of all users.

5.3 Recommendation

After implementing in this project, there are many advantages and benefits to be gained. Among these are the ease with which one works, especially went watering the plant. However, each project created has its own drawbacks. To overcome the weaknesses of this project, there are several ways you can do it. These are:

1. Create a box so that the project can look organized.
2. Create something that the component in the project can be easy to remove and inspect so that it can easily be fix.
3. Create the project that can also be function with a timer as well.

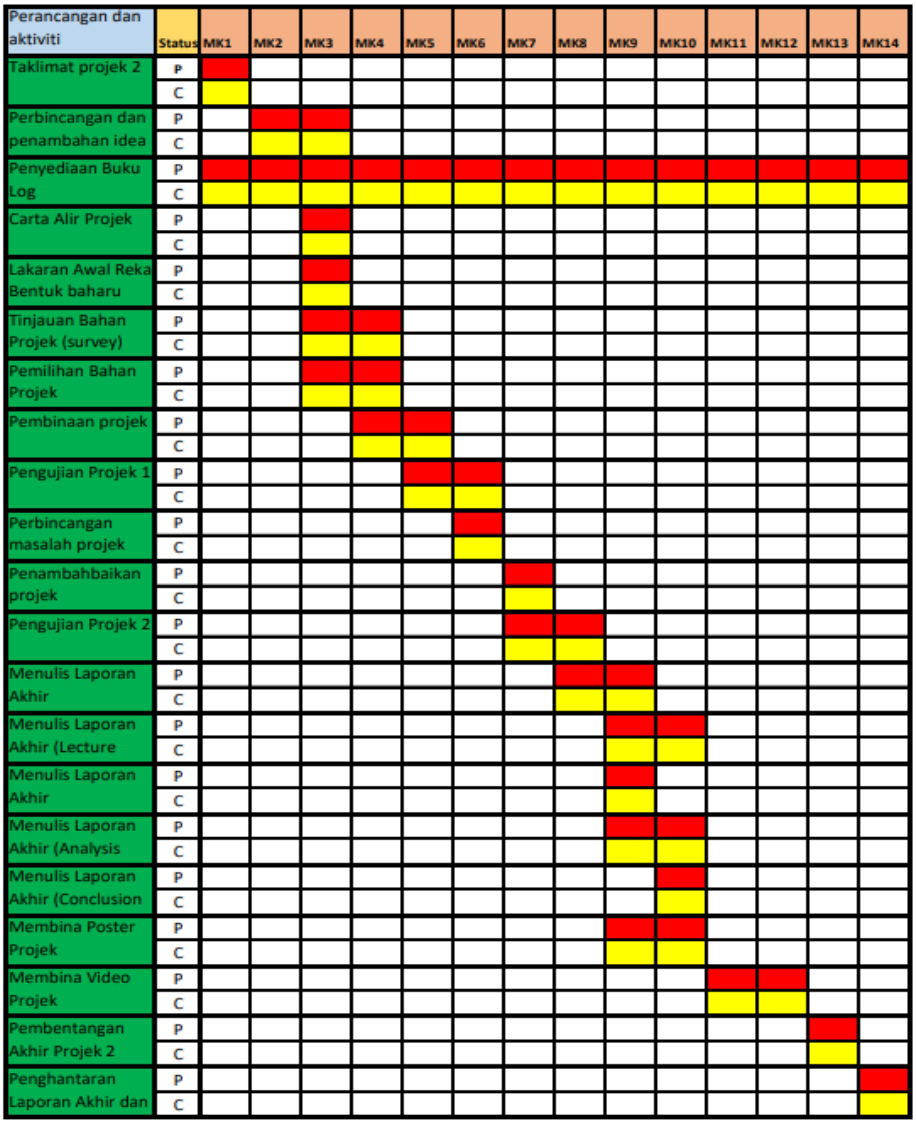
6) REFERENCES

- **Ojha,M., Mohite,S., Kathole,S., & Tarware,D. (2016). Microcontroller Based Automatic Plant Watering System. Department of Computer Science, F.C.R.I.T Vashi, Mumbai, India**
- **Divani,D., Patil,P., & Punjabi,S.K. (2016) Automated Plant Watering System. International Conference on Computation of Power, Energy Information and Commuincation (ICCPEIC)**

7) ATTACHMENT

APPENDIX 1

i. Gantt chart



APPENDIX 2

NO	MATERIAL	PRICE OER UNIT	QUANTITY	TOTAL
1	Water Sprinkler	RM6.90	1	RM6.90
2	Water pump	RM19.00	1	RM19.00
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4	Water Hose (5 Meter)	RM8.40	1	RM8.40
5	Temperatur e Sensor	RM14.90	1	RM14.90
6	Arduino Uno Board	RM39.40	1	RM39.40
7	Relay	RM12.20	1	RM12.20
8	Jumper Wire	RM0.10	10	RM1.00
9	Rechargeabl e Battery 12V 5AH	RM65.00	1	RM65.00
10	Solar Panel 10W	RM90.00	1	RM90.00
11	Solar PWM Controller (C) 10A	RM40.00	1	RM40.00
12	Wire (2 Meter)	RM3.00	1	RM3.00
ESTIMATION COST				RM303.20
MARKET VALUE				RM400.00

APPENDIX 3

TEMPERATURE(°c)	COMPONNENT WORKING
20 and above	Water pump working
19 and below	Water pump not working

Table 2: Analysis Water Pump React with Temperature

APPENDIX 4

NO	DATE	WEATHER	FREQUENCY
1	21/11/2021 (SUNDAY)	SUNNY	5
2	22/11/2021 (MONDAY)	SUNNY	7
3	23/11/2021 (TUESDAY)	RAINY	1
4	24/11/2021 (WEDNESDAY)	RAINY	0
5	25/11/2021 (THURSDAY)	SUNNY	9
6	26/11/2021 (FRIDAY)	RAINY	2
7	27/11/2021 (SATURDAY)	RAINY	0

Table 3: Frequency Soil Moisture Sensor React with Weather

APPENDIX 5

APPENDIX 6

SURVEY RESULT