CHAPTER I
INTRODUCTION

1.1 Background

In performing activities of daily life, people cannot be separated from the process of thinking hence to survive in the ever-changing circumstances, uncertain, and the competitive, they must have the ability to acquire, select, and process information. This capability requires critical thinking, systematic, logical, and creative and has a willingness to cooperate effective that can be obtained from the learning process in schools.

Therefore, in the learning process, students should be trained in the skills of thinking, especially higher order thinking skill. Higher order thinking skills are very important to be integrated in any subjects, including physics lessons in high school.

Higher order thinking skill is thinking at a higher level than just memorize facts or say something to someone exactly like something that was delivered to us. King et al. assumed that higher order thinking skills include critical, logical, reflective, metacognitive, and creative thinking. They are activated when individuals encounter unfamiliar problems, uncertainties, questions, or dilemmas.

Higher order thinking skills *(High Order Thinking Skills* - HOTS) is a thought process that is not just memorize and pass back information known. It is the ability to connect, manipulate, and transform knowledge and experience already possessed to think critically and creatively in an effort to determine the decisions and solve problems in new situations. Means the use of higher order thinking skills must think more than just remembering, understanding and applying the formula. In a process of learning physics if student use higher order thinking skill, the learning will be a meaningful learning. Because student do not only have to remember and memorize formulas but also be able to solve a problem by using these formulas. Directly or indirectly, student will better understand the usefulness of these formulas in their daily live, it makes lessons

more meaningful, therefore children will not easily forget to formulas and concepts of Physics.

According to one of the International Study on students' cognitive abilities are *TIMSS (Trends in Mathematics and Science Study)* conducted by *the IEA (International Association for the Evaluation of Educational Achievement).TIMSS* 2011 results in the field of physics shows Indonesia gained 397 value, this value is below the international average is 500. The data indicates that the absorption of learners in learning in physics education. Based on the results of *TIMSS*, it can be said that the students' ability to think critically Indonesia is still low

Researcher has observed that higher order thinking skill in physics lesson is low. Students in X just reached 62 score in final examination physics lesson. Student in XI achieve score 60, then student in XII just reached 62. Those are average score student reached in final physics examination. It’s too far from absolute score (KKM) 75 who students must reached. In addition, students are not familiar to solve physics problems in divergent question. According to the students, they only solve problem that had already given by teacher. Teacher use conventional learning from beginning till end of learning process, teacher just use question and answer, discussion tends to procedural and more emphasis on learning outcomes, instead of the understanding of the concept. Students learn in accordance with the examples who given by teacher and an example in the book. The questions were given to students only convergent questions that directly use the existing formula. Hence, students do not have the opportunity to develop the creativity and productivity of thinking, it makes when teacher give divergent question in final examination, student can’t reach out good score.

To overcome this problem, we need model student-centered. One model that can be used is a discovery learning model. Jerome Bruner in Arends believe that discovery learning is a model of teaching that emphasized the importance of helping students understand the structure or key ideas of a discipline, the need for active student involvement in the learning process, and a belief that true learning comes through personal discovery (2012;402). Discovery learning is a type of learning where learners construct reviews their own knowledge by experimenting

with a domain, and inferring rules from the results of reviews these experiments. The basic idea of this kind of learning is that learners can design because reviews their own experiments in the domain and infer the rules of the domain themselves they are actually constructing reviews their knowledge. Because of reviews these constructive activities, it is assumed they will understand the domain at a higher level than when the necessary information is just presented by a teacher or an expository learning environment (Joolingen.1999). The use of this model is expected to increase students learn on cognitive outcomes compared to taught by conventional learning.

Research of models with the type of discovery has been made by Yurahly et al. (2014) in SMA N 4 Palu, the results showed that the average value of the experimental class students 6.7% higher than the control class. Putrayasa et al. (2014) founded the average value of students who learned by discovery model was 79.39, while the average value of a class of students who follow the conventional learning was 70.51. Balim (2009) obtained data that the students of class VII of the Public Elementary School in Turkey who used discovery model was 71.17 while students who used conventional learning had 67.03 average values. Yang et al. (2010) conducted a study in Taiwan's elementary education obtain data that discovery class obtain an average value 57.63 while the class who do conventional model was 46.41.

From the research conducted, Yang et al. (2010) revealed that the discovery learning is benefit to the students in the medium and high performance level, but for the low performance were less used. This weakness was also founded by Putrayasa et al. (2014) that the discovery model is more effective to students who have high desire to learn while for students who lack interest in learning takes a long time to implement this model. Likewise, Yurahly et al. (2014) found that the model need more time because this model need mature of teacher as be facilitator and a good motivator.

Based on four studied, researcher interest to do next research to find the problem of student in learning process, so that the results of this study not only

guided the students' difficulties in solving problem, but also other factors associated with the learning process.

Based on the description above, the researchers felt compelled to examine and investigate more about the various factors and problems faced by students in physics with the title: *"The Effect of Discovery Learning Model Toward Student's Higher Order Thinking Skills in Dynamic Electricity Subject Matter at SMA Raksana Medan Academic Year 2014/2015"*.

1.2 Problem Identification

Based on the background, the identification of problems research are:

1. Physics learning process is teacher center.
2. The low student higher order thinking skill. .
3. The lack of analytical ability of students to the problems of physics.
4. The use of methods or models of teaching are less varied.

1.3 Problem Limitation

Based on the identification, the authors limit this problem, those are:

1. Learning model used is the Discovery Model.
2. Subject matter that will be present is Dynamic Electricity to student at SMA Raksana Medan in 10^{th} grade student.
3. Analysing student higher order thinking skill.

1.4 Problem Formulation

Based on the problem definition, the problem formulations in this research are:

1. How is student higher order thinking skill using Discovery Learning Model in Dynamic Electricity subject matter to 10^{th} grade student semester II at SMA Raksana Medan?
2. How is student higher order thinking skill using conventional learning in Dynamic Electrical subject matter to 10^{th} grade student semester II at SMA Raksana Medan?

3. Is student higher order thinking skill using Discovery Learning Model better than using Conventional Learning in Dynamic Electricity subject matter to 10^{th} grade student semester II at SMA RAKSANA Medan?

1.5 Purpose of Research

The purpose of this study at SMA Raksana Medan in Dynamic Electricity subject matter to student in 10^{th} grade are :

1. To analyze student higher order thinking skill using discovery learning model.
2. To analyze student higher order thinking skill using conventional learning on.
3. To analyze which one is better, student higher order thinking skill in discovery model or conventional learning.

1.6 Research Benefit

After research is complete, the expected benefits of this research are:

1. Student mastery and likely study about physics because students can pull out, thinking, researching, hypothesized, discuss and conclude physics lessons.
2. As input for physics teachers in an effort to use the model in physics learning to improve higher order thinking of student