

INDONESIA UNIVERSITY OF EDUCATION
FACULTY OF SCIENCE AND MATHEMATICS EDUCATION
DEPARTMENT OF PHYSICS

REPORT FOR OPEN LESSON PREPARATION
AND IMPLEMENTATION ON OHM'S LAW



By

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Date 14/01/2013

Time 7:00AM-1:00 PM

Place of open lesson: **School SMAN 2 Cimahi**

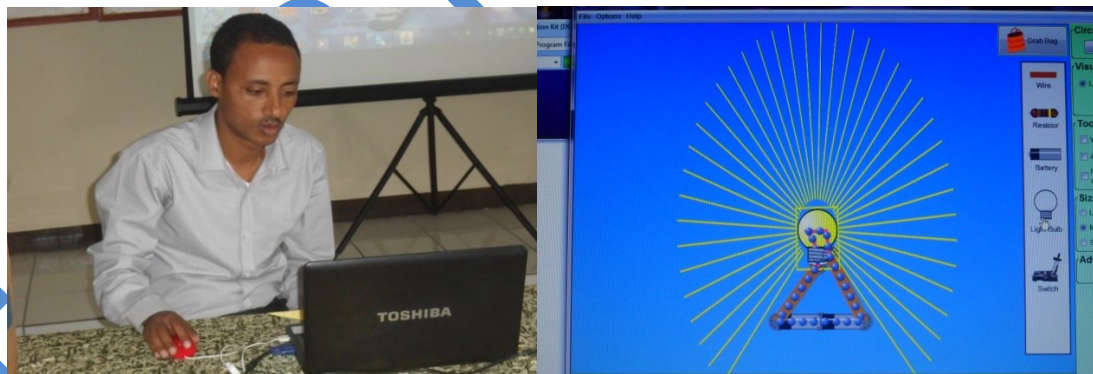
Objectives: the main objectives of the open lesson is in order to

- Practice and apply what I learn in teaching physics and experimental physics.
- Write an article.

General Introduction

Lesson study is one of the means of improving the quality of education by identifying the difficulties of students on topics. Lesson study has three phases and it is cyclic. The first phase is plan. In this phase, teachers come together and decide the topic to be learnt and then discuss about the topic, material, time, method of teaching, method of assessment. The second phase is doing (implementation) according to the plan. The last phase is seeing (evaluation) whether the plane is implemented successfully or not. Teachers evaluate their implementation and give feed for the next open lesson.

Like these I discussed with Dr. Selly and Dr. Ida about the grade level and topic of the lesson. After discussion, we decide teach grade 10 students and Ohm's law is the topic of the lesson. We plan together about material needed, method of teaching and method of assessment (Appendix A).



Implementation

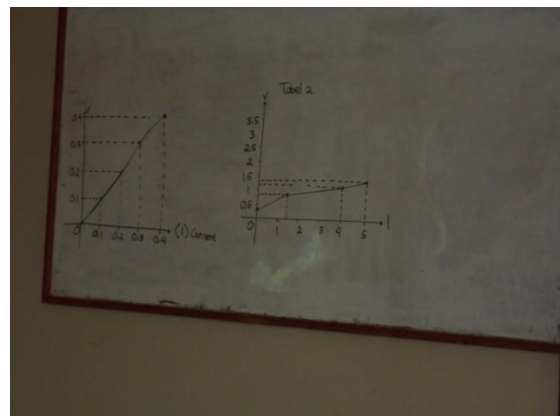
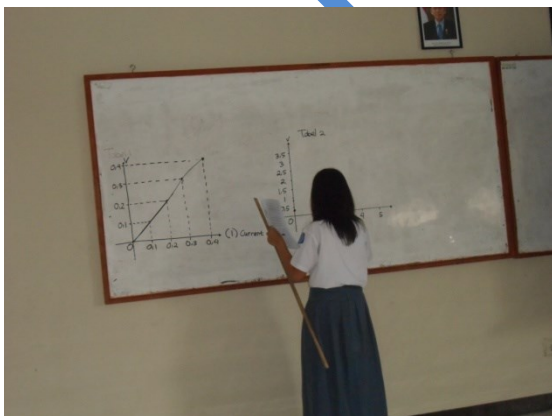
I implemented our plan on 14/01/2013. Before I start my lesson the school principal talk short well come speech. Then I start my lesson at 9:00AM. First, I gave student pre-test (Appendix B). After collecting the pre test, I introduced the lesson to students and I show animation of direct current in a simple closed circuit. I medially, I asked them questions for investigation. I showed how to read ammeter and volt meter. Then I gave students picture of circuit and



Procedures (Appendix C) and I allow them to start their investigation. Really, students were actively engaged on investigation. They read and recorded data. Only two groups present their findings because other groups' finding is similar to the presenter and to save time.



Their interpretation and analysis was correct. The graph what they draw for given Ohmic device is straight line passing through the origin while for diode (non ohmic devices) is curve as expected.



After summer of the lesson, I gave post test which is the same to pre test. This enables me to see the progress of students. Lastly, we conduct post discussion about the lesson.



Except little constraint of language, generally I can say the lesson was successful because the stated objectives are attained by students. I checked this from the post test and from their analysis of data during the lesson. We can see the above photo for graph. I get good experience of preparing and implementing open lesson. I am happy by teaching such kind of interesting and claver students.



Appendix A

LESSON PLAN

School: SMAN 2 Cimahi

Name of the teacher:- Alex

Subject: Physics

Date: 14/01/2013

Grade for which the course delivered__10
minutes

Time duration 90

Title of the unit:- Electrodynamics

Lesson Topic:- Ohm's law and Electric resistance.

Minimum learning competency/ Standard:-

- Students formulate electrical quantities in simple closed loop.
- Students use electrical measuring tools.

Specific objective of the lesson (Indicators):- At the end of this lesson learners will be able to:-

- State the full statement of Ohm's law.
- Differentiate ohmic and non-ohmic materials based on the relation between voltage and current data from the experiment.
- Determine resistance of Ohmic materials based on the graph of voltage versus current.
- Apply Ohm's law to solve related problems.

Learning Method; Experiment

Questions to Investigate (discovery lesson or inquiry activity):

- ❖ What is the relationship between direct current through devices (bulb and diode) and the potential difference across ends of these devices?
- ❖ Does ohm's law work for all devices?

Materials and Equipments

- Connecting wires (10 branch connecting wires & 5 connecting wires)
- Ammeter (5)
- Bulb and its stand (5)
- Diode (5)
- Voltmeter (5)
- Power supply (5)

Procedures

1. Construct a circuit containing dc low voltage supply, resistor, voltmeter and ammeter based on **circuit diagram** provided by your teacher.
2. Turn the power supply ON with the voltage control initially set to **zero**. Using the voltage adjustment control, increase the current through the resistor to 0.1A. Read and record the voltage on the **table 1**.
3. Repeat step 2 for 0.2A, 0.3A, 0.4A, 0.5A and 0.6A

4. Please repeat procedure **2** and **3** in **experiment A** by substituting a **diode** in place of the bulb. Record your data on **table2**

The Steps on Learning Activity

Levels/stages	Teacher's activities	Time	Learner's/Student's/ activities
Introduction	<ul style="list-style-type: none"> ❖ Introducing the lesson. ❖ Show simulation of simple circuit and I ask questions like. <ul style="list-style-type: none"> • What does flow through the wire? • Can the bulb light up without battery? ❖ What is the relationship between current and voltage? Let us conduct experiment ❖ I show the block diagram of Ohm's circuit. ❖ Showing students how to read ammeter and voltmeter ❖ Grouping students to conduct experiments ❖ I give the detailed procedures to students 	15'	<ul style="list-style-type: none"> ❖ Give answer to the oral questions ❖ Asking question ❖ Forming group
Implimentation	<ul style="list-style-type: none"> ❖ Assisting students while they conduct experiments. ❖ Allow students to present their findings. ❖ Giving corrections and make conclusion. 	45'	<ul style="list-style-type: none"> ❖ Construct the real circuit. ❖ Reading and recording data on the data table. ❖ Drawing voltage versus current graph. ❖ Writing their conclusion. ❖ State Ohm's law ❖ Present their findings ❖ Applying Ohm's law to solve some problems.
Stabilization/summery/	<ul style="list-style-type: none"> ❖ Could you summarize the lesson? 	10'	Summarizes the lesson
Assessment	After summery, I give worksheet for each student.	20'	Give answers to questions and solve for problems given on the TEST

Appendix B

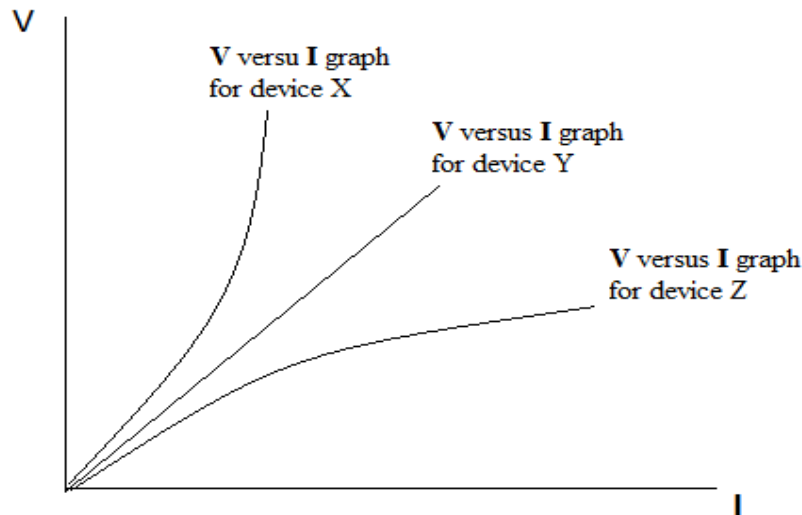
Pre test

Nama _____ Kelas _____

(waktu 20 menit)

I. PILIHLAH JAWABAN YANG PALING BENAR DIANTARA PILIHAN YANG TELAH DIBERIKAN DAN TULISLAH JAWABAN ANDA PADA TEMPAT YANG TELAH DISEDIAKAN

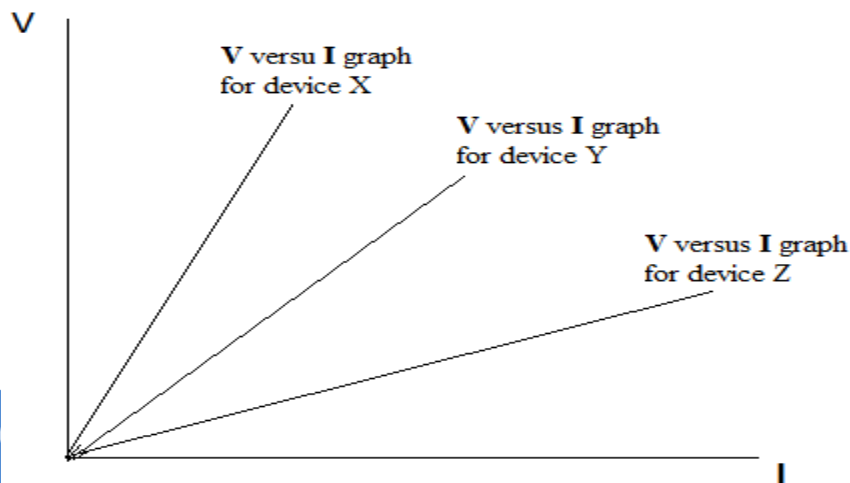
- _____ 1. Alat untuk mengukur arus adalah
A. Voltmeter B. Ammeter C. Ampere D. Semua benar
- _____ 2. Aliran muatan setiap waktu disebut
A. Tegangan B. Hambatan C. Arus D. Muatan
- _____ 3. Ketika Anda ingin menghitung tegangan, Anda harus menghubungkan
voltmeter secara
A. Paralel B. Seri C. Hubungkan saja D. Tidak terhubung
- _____ 4. Jika tegangan pada material ohmik bertambah, maka arus yang mengalir
pada material tersebut akan
A. Bertambah B. Menurun C. Tetap konstan D. Tidak terpengaruh
- _____ 5. Kemiringan grafik tegangan terhadap arus disebut
A. Tegangan B. Arus C. Hambatan D. Semua benar
- _____ 6. Grafik tegangan terhadap arus untuk X, Y, Z.



Grafik manakah yang sesuai dengan Hukum Ohm

- A. X B. Y C. Z D. Semua benar

7. Dari grafik dibawah ini, yang manakah yang memiliki Hambatan terbesar



- A. X B. Y C. Z D. X, Y, Z memiliki besar hambatan yang sama

8. Secara matematis, Hukum Ohm dijelaskan dengan

- A. $R=IV$ B. $I=\frac{R}{V}$ C. $V=\frac{R}{I}$ D. $V=IR$

9. Jika pada hambatan ohmik diberi tegangan 30V, dan arus yang mengalir pada hambatan tersebut sebesar 5A, maka nilai hambatan pada hambatan ohmik tersebut adalah

- A. 150Ω B. 6Ω C. 15Ω D. 20Ω

_____ 10. Jika sebuah resistor terhubung pada 8V baterai, dan arus yang mengalir pada resistor tersebut adalah 2A. Berapakah nilai arus yang mengalir jika resistor tersebut dihubungkan pada 12V baterai

- A. 2A B. 3A C. 24A D. 6A

TCTP Program

Appendix C

EXPERIMENT A: (Verifying Ohm's law)

Materials and equipments(Alat dan bahan)

- *Connecting wires (2 branch connecting wires & 1 connecting wires)*
(Kabel penghubung(2 cabang kabel penghubung & 1 kabel tunggal)
- *Ammeter (1)*
(Amperemeter)
- *bulb and its stand (1)*
(Lampu dan dudukan 1)
- *Diode (1)*
(Dioda 1)
- *Voltmeter (1)*
(Voltmeter)
- *Power supply (1)*
(Catu daya 1)

PRECAUTION!!!

(Perhatian)

1. *The switch should be **ON** only while taking readings unless make it **OFF** in order to avoid damage to power supply, ammeter and voltmeter.*

(Catu daya harus dalam keadaan ON bila akan mengukur besaran-besaran pada catu daya, amperemeter, dan voltmeter untuk mencegah kerusakan alat)
2. *All the electrical connections must be neat and tight.*

(Semua penghubung harus dalam keadaan bersih dan kuat)
3. *Voltmeter and Ammeter must of proper range.*

(Voltmeter dan amperemeter harus dalam jarak yang tepat)

Procedures

5. *Construct a circuit containing power supply, bulb, voltmeter and ammeter based on **circuit diagram** provided by your teacher.*
(Buatlah rangkaian yang terdiri dari catu daya, lampu, voltmeter dan amperemeter berdasarkan diagram rangkaian yang disediakan oleh guru)

6. Turn the power supply **ON** with the voltage control initially set to **zero**. Using the voltage adjustment control, increase the current through the **bulb** to 0.1A. Read and record the voltage on the **table 1**.

(Nyalakan catu daya dengan men-set tegangan pada angka nol. Kontrol tegangan dengan menggunakan tombol output pada catu daya, nyalakan tegangan pada lampu sampai 0.1 A. Baca dan catat besarnya tegangan yang diamati pada table 1.)

7. Repeat step 2 for 0.2A, 0.3A and 0.4A

(Ulangi langkah 2 untuk besar tegangan 0.2 A, 0.3 A, dan 0.4 A.)

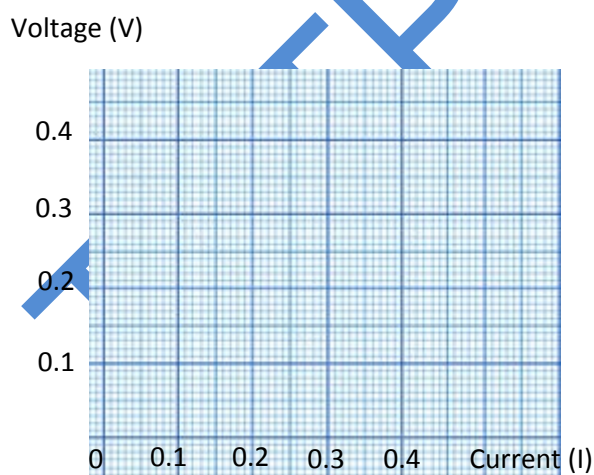
Current I in ampere (A)	Voltage V in volt (v)	Slope = $\frac{V-0}{I-0} = \frac{V}{I}$
0		
0.1		$\frac{V}{I} =$
0.2		$\frac{V}{I} =$
0.3		$\frac{V}{I} =$
0.4		$\frac{V}{I} =$

Table1

Data Analysis

1. By using data in Table 1, plot a graph of voltage **V** versus current **I** on **graph paper**. Label the vertical axis voltage and the horizontal axis current as shown below.

(Dengan menggunakan data pada table 1, gambarkan grafik tegangan V terhadap arus I pada kertas grafik. Tandai garis vertical sebagai tegangan dan horizontal sebagai arus.)



2. Is the graph is a straight line or curved?

(Apakah grafik yang ditunjukkan merupakan garis linier atau berbnetuk kurva?)

3. Find the slope of the graph at different points ($\frac{V-0}{I-0} = \frac{V}{I}$). Record on each result on the **Table1**.

What is the special name of this slope?

(Temukan simpangan pada grafik yang menunjukkan ($\frac{V-0}{I-0} = \frac{V}{I}$). Catat hasilnya pada table 1.

Apa yang dimaksud dengan simpangan tersebut?)

Is the slope nearly the same or widely different for different points?

(Apakah simpangan tersebut sama atau sangat berbeda dengan titik yang lain?)

Conclusion

(Kesimpulan)

Are the voltage and current directly proportional, inversely proportional or neither?

(Apakah tegangan dan arus berbanding lurus atau berbanding terbalik atau tidak kedua-duanya)

*Does your conclusion work for any devices? Please conduct **experiment B** in order to answer this question.*

(Apakah kesimpulan anda terbukti untuk setiap alat? Lakukanlah eksperimen B untuk dapat menjawab pertanyaan.

EXPERIMENT B

*Please substitute a **diode** in place of the bulb and record the corresponding current for each voltage given in the **table2** below.*

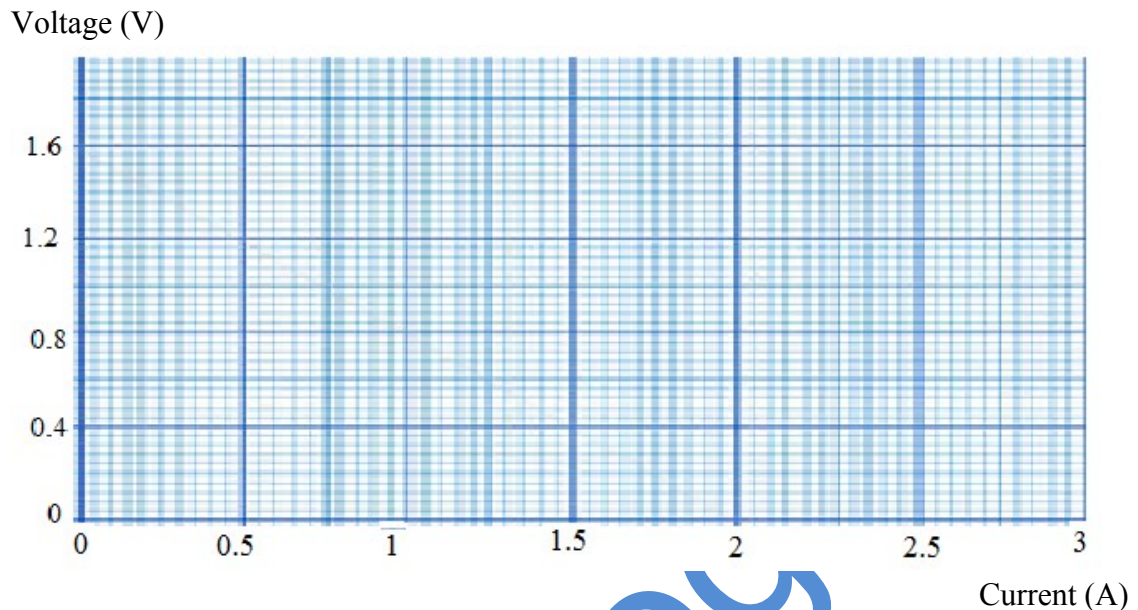
(Ganti lampu dengan dioda dan catat arus yang dihasilkan untuk tiap besaran tegangan yang diberikan pada table 2)

Voltage V in volt (v)	Current I in ampere (mA)	Slope = $\frac{V-0}{I-0} = \frac{V}{I}$
0		
0.4		$\frac{V}{I} =$
0.8		$\frac{V}{I} =$
1.2		$\frac{V}{I} =$
1.6		$\frac{V}{I} =$

Table2

*By using data in **Table 2**, plot a graph of voltage V versus current I on*

graph paper. Label the vertical axis voltage V and the horizontal axis current I
(Dengan menggunakan data pada table 2, gambarkan grafik tegangan terhadap arus pada kertas grafik. Tandai garis verikal sebagai tegangan dan horizontal sebagai arus.)



1. Is the graph is a straight line or curved?

(Apakah grafik tersebut linier atau berbentuk kurva?)

2. Find the slope of the graph at different points ($\frac{V-0}{I-0} = \frac{V}{I}$). Record on each result on the Table2.

Is the slope nearly the same or widely different for different points?

(Temukan simpangan pada grafik yang menunjukkan ($\frac{V-0}{I-0} = \frac{V}{I}$). Catat hasilnya pada table 1.

Apa simpangan tersebut sama ataukah berbeda dengan titik yang lain?)

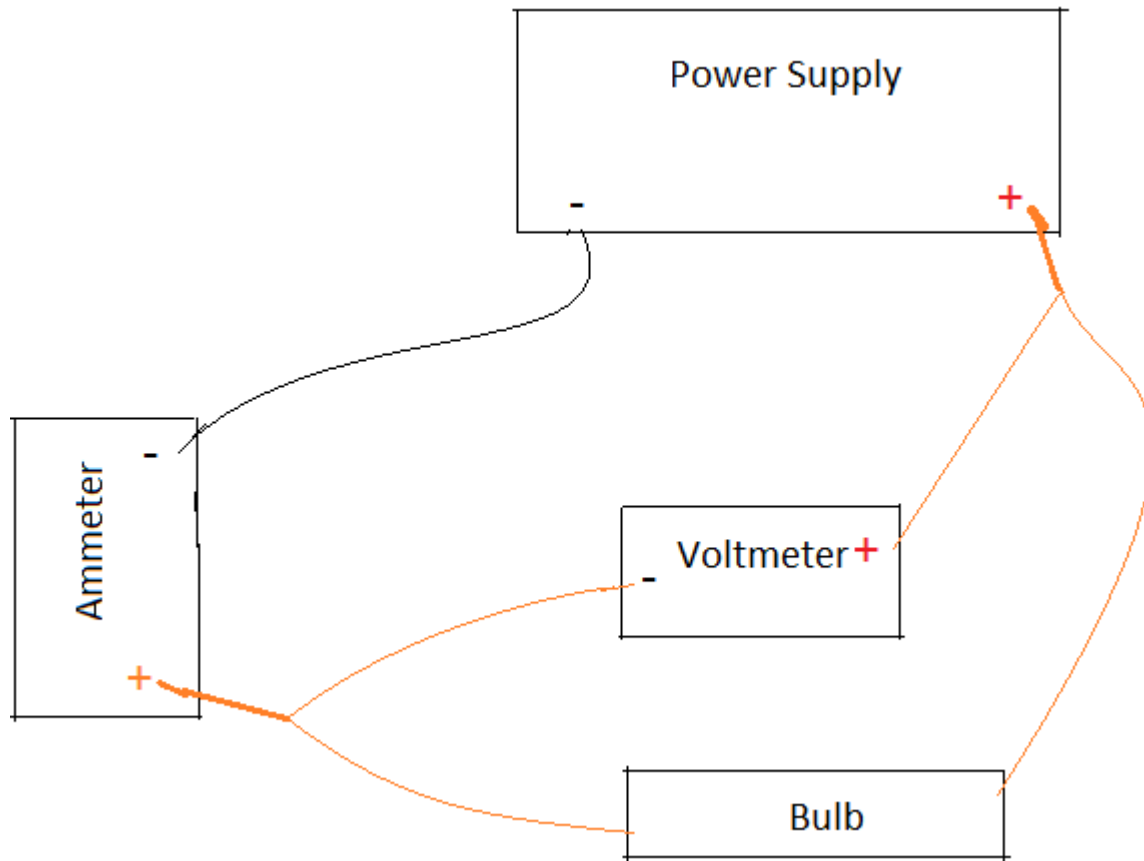
Conclusion (Kesimpulan)

Are the voltage and current directly proportional, inversely proportional or neither?

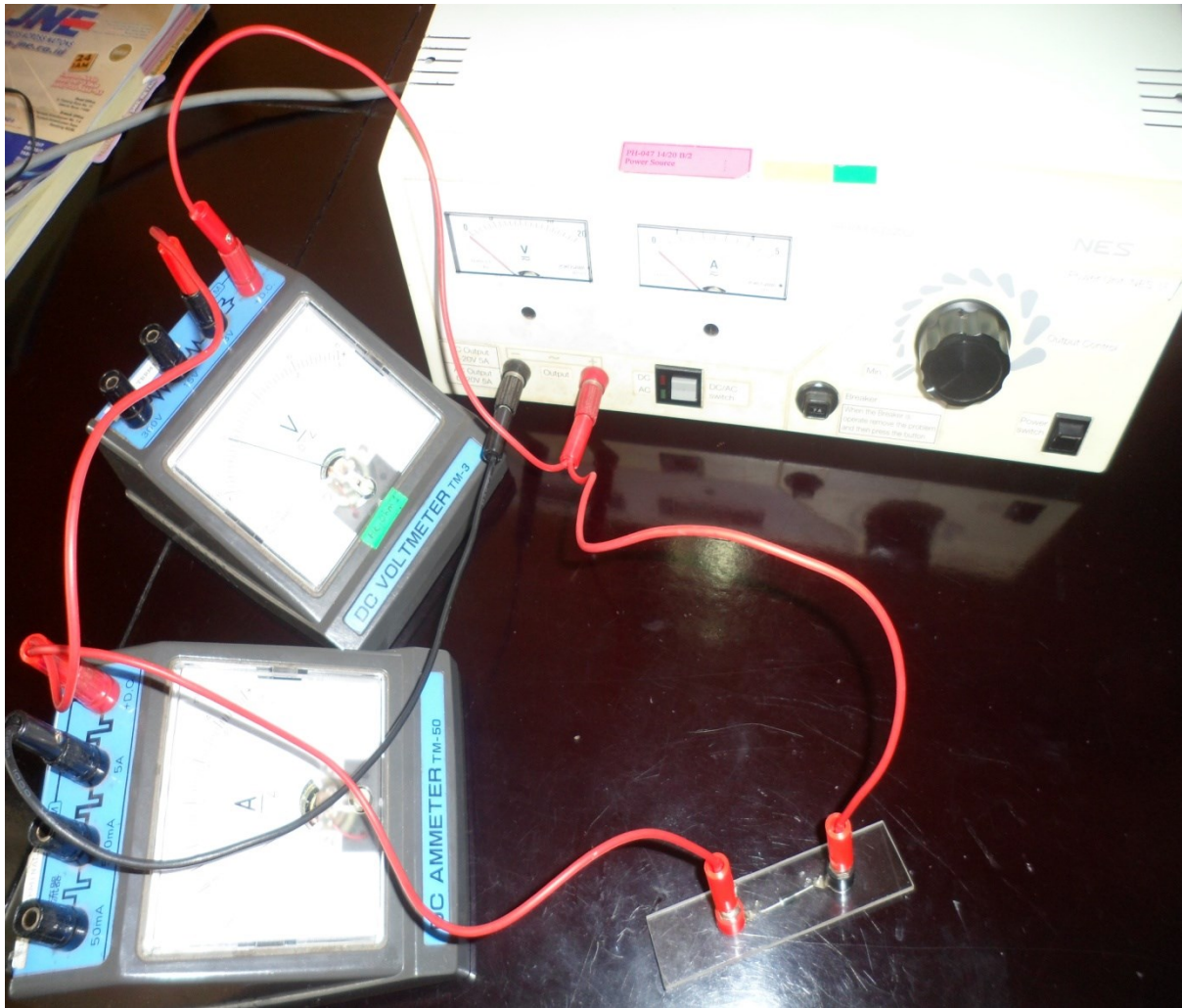
(Apakah tegangan dan arus berbanding lurus atau berbanding terbalik atau tidak keduanya)

Appendix D

Circuit Diagram picture of real circuit



TCTP



TCTP