



INTRODUCTION

This summary was arranged as a guideline for the students to do a laboratory work of General Chemistry I in faculty of Mathematics and Natural Science, Yogyakarta State University. The aim of this summary involves:

1. The main target:
 - a. Give the experiences to do the ways of experiment and the result of observation for the chemistry phenomenons.
 - b. Give some illustrations about the studying material.
 - c. Give the deeper knowledge about chemistry, especially about the framework of basic theory of chemistry and the way to solve the chemistry problem.
 - d. Instill awareness of the correlation of various other natural sciences and their limitations.
2. Special targets:
 - a. Develop skill in stoichiometry, balance and the using of energetics in chemistry system.
 - b. Train to do the accurate observation.
 - c. Train skill to use the glasses instrument, chemistry substance, and instrument.
 - d. Train to analyze the experiment data and write the report.
 - e. Give the motivation to do experiment.



THE RULES IN CHEMISTRY LABORATORY WORK

A. General

1. Each of the students of laboratory work should be responsible to obey the rule of laboratory work.
2. Each of the students must keep the order and the safety in the laboratory.
3. Be careful in using the equipment and the chemistry substances because they are usually expensive and danger.
4. The students of laboratory work are forbidden to eat or drink during doing an experiment.

B. Implementation of Laboratory Work

1. To do the laboratory work the students must register the practical work in the first and the second week on the beginning of semester by showing the credit semester and pay the guide book of laboratory work.
2. The students must follow the chemistry laboratory work assistance on the third and the fourth week on the beginning of semester.
3. Each of the students must come on time and fill the attendance list before the laboratory work is started. Be late in 10 minutes without acceptable permission will be considered as an absent and will not be permitted to do a laboratory work. The students absent must give the permission to the lecturer.
4. Before do the laboratory work the students must have learnt the laboratory work material which will be done, because it will be a written pretest.



5. The students must wear a white laboratory work coat during the laboratory work.
6. To do the laboratory work the students must borrow the equipment by using the student card.
7. The students do the practical work seriously to understand the using of the equipments and do their report only. If there is any difficulty the students can ask to the assistant or the lecturer.
8. After finish the practical work the students must make a temporary report which has been gave a signature by the lecturer.
9. The students leave the room after they turn of the gas crane and lading, and then clean the trash.
10. Each of the students must make a formal report based on the data from the temporary report and should be collected to the assistant on the next laboratory work.
11. The students, who can't attend the laboratory work on the schedule, will be given a chance to do the practical work on the Intermission week, by paying IDR 7.500 each of the experiments. Intermission week will be limited in twice maximally.

Every single thing do not included yet in this rules will be rule separately



INTRODUCTION AND APPLICATION OF THE GLASS APPARATUS

A. The glass equipments

1. Test tubes: being used for many activities such as mixing or heating the solution in little amount.
2. Nessler tubes: to decide the concentration of the solution based on the density of the color.
3. Beaker: being used for holding liquid. Pyrex beaker can be used to heat. Do not used to measure the volume because it is inaccurate. Not be used to make NaOH solution concentrated.
4. Erlenmeyer flask: For volume 50 - 2000 mL to keep the solution or chemistry substance, to heat the liquid, to retain distillate on the distillation and others. When the flask consists of the sterile solution, the flask must be closed.
5. Graduated cylinder: For volume 5 - 2000 mL, to measure the solution or the liquid that needed conform to the necessity. Do not use to dissolve or to dilute the solution.
6. Glass funnel and filter paper: to filter the solution.
7. Pipette: to put a solution or to add the solution in little amount.
8. Volumetric pipette: for volume 1-100 mL, to put a solution which has the appropriate volume based on measurement in the pipette, the fat removed with sulphate chromic acid.

How to use:

- a. Suction the solution to the pipette with a mouth, the pointed tip of the pipette must soaked 2-3 cm in the liquid in order to avoid solution will suction in a mouth.



- b. Then make the pipette stand upright and the pointed tip of it is closed with a finger to avoid the solution flows out. By moving a thumb and a middle finger used to hold the pipette, let the liquid drops from the tip of the pipette until the meniscus of the surface of the liquid reach the scale.
 - c. After the liquid is flowed out from the pipette, let the liquid left flows in 30 second. Do not blow the liquid in the tip of the pipette because the drops will not be sent out when the pipette is engraved.
 - d. Measuring Pipette, for volume 1-25 mL, to put the substance that the volume needs to be measured, the fat removed with using the sulphate chromic acid.
9. Evaporating dish: to dry the solid substance by putting the substance in the air or oven, to keep the substance temporary.
10. Burette: used to do a titration. The substance used to do a titration is placed on the burette and then the substance is flown little by little through a crane.

**SEVERAL PROCESSING TECHNIQUES ARE
OFTEN PERFORMED IN THE LABORATORY**

1. Diluting the concentrated acid
Pour the concentrated acid to the water and stir it, don't be vice versa, by pouring the water to the concentrated acid.
2. Heating the test tube
Confronted the hole mouth of test tubes to a safe place so that the sprinkling do not touch the students.



3. The experiment which produces a dangerous gas for our healthy should be done in the acid cupboard or the outside of the laboratory.
4. If we will put in the thermometer or glass pipe in the hole of rubber or sponge, wetting the tool with water, hold closer the part which is put in the water by using the wet cloth. Put it in the glass with the threaded glass.
5. Burette leak
Pour the liquid to the other bowl. Open the crane burette then wipe by using the filter paper or tissue all the part of crane. The liquid pipeline must not be obstructed by inappropriate objects. Smear the part which is shaded by using the Vaseline. Put on again the crane, turn to make sure that the Vaseline is already spread evenly. Just it.
6. Suction the liquid by using the appropriate pipette (volumetric pipette)
The tip of the pipette must be submerged in the liquid. Suction the liquid till pass the limit sign in a line shape. Dry the outside part of the pipette tip which exposure the liquid by using the filter paper. Organize the pipette to stand upright and the liquid is located exactly in the sign. The liquid is moved in the bowl.
7. Weighing
The substance that measured must not be put on the balance plate directly, should use the beaker, balance bottle, watch glass, filter paper or other appropriate bowls.



CONTENTS

Preface	i
Introduction	ii
Contents	vii
Experiment 1	
Determination of the compound formula from the experiment data	1
Experiment 2	
Determination of the relative atomic mass	7
Experiment 3	
Analyze gas which is based on the molar volume	11
Experiment 4	
Determination of the gas molecular formula in Eudiometry	17
Experiment 5	
Enthalpy reaction	22
Experiment 6	
Entropy of the System	28
Experiment 7	
Valence of the Elements	33
Experiment 8	
Electronegativity characteristic of Elements	37
Experiment 9	
Analyze in colorimetric	41
Experiment 10	
Acids, bases and the titration curve.....	48
Bibliography	55

