Berkeley City College

Chemistry 1B Syllabus, Fall 2016

Instructor: Siraj Omar, Ph.D.

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## I. Meeting Time: Lecture: 0900 – 1150 MF (BCC 034)

Lab: 0900 – 1150 W (BCC 521)

Office hours: 2:00 – 4:00 PM, MW (LRC, 1st floor; drop-in)

1600 – 1700 Th (BCC 523; by appointment)

## II. Description & Objectives

Chem 1B, the second part of college general chemistry, will cover materials under the following topics: chemical kinetics; equilibria (chemical and in aqueous solutions); acids, bases and buffer solutions; entropy and free energy; redox reactions and electrochemical processes; the chemistry of main group elements and their uses; the chemistry of transition elements and their coordination compounds; nuclear chemistry, and an introduction to organic and biological compounds.

As in Chem 1A, this course emphasizes on the understanding of basic chemical principles associated with chemical processes occurring in the laboratories and in nature, as well as their industrial significance. Problem solving and laboratory exercises are important aspects in this course. There will be weekly experiments and homework assignments that will help you acquire essential practices and skills. (Pre-requisite: obtain grade C (or better) in Chem 1A)

(Chem 1B is a pre-requisite for organic chemistry 12A. It is a transferrable course to UC and CSU; a required subject for all science majors, medical program, and degrees in dentistry and pharmacy.)

**Student Learning Outcome**:

Upon completing this course students will acquire the following knowledge and skills:

1. Solve quantitative chemistry problems and integrate multiple ideas, that include incorporating stoichiometric and algebraic relationships, in problem solving processes.
2. Explain qualitative trends in physical and chemical properties of elements and use molecular level concepts (physical and/or chemical) to explain macroscopic properties of matter.
3. Perform experiments according to laboratory safety procedures; collect and analyze experimental data; interpret results that include graphs construction; write organized laboratory reports.

III. **Books and Supplies:**

A. Required Materials:

* Zumdahl & Zumdahl, "CHEMISTRY" 9th Edition, Brooks/Cole Cengage Learning.
* OpenStax (OER): http://cnx.org/contents/havxkyvS@9.311:uXg0kUa-@4/Introduction
* Chem 1B Reader/Laboratory Manual, Siraj Omar, Berkeley City College, (Copy World)
* Laboratory Notebook, Safety goggles, and Scientific Calculator

## B. Recommended Materials: Study Guide to accompany your text and Lab coat or apron.

IV. **Grading:** A. Grade Weighting Factors: B. Grade Percent Distributions:

Tests 40% A: > 90%

Final Exam 20% B: 79 - 89%

Quizzes 15% C: 65 - 78%

Laboratory 20% D: 51 - 64%

Homework 5% F: < 50%

C. Note that lab, homework, quiz, and test scores are not equivalent. The percentage score that is important.

V. **Homework Assignments**

Homework selected end-of-chapter problems will be assigned. The assigned problems and the due date for each problem set are contained in this syllabus. It is important that you show the complete solutions for each problem. No credit will be awarded if you simply write the answers without showing the work or calculations. Moreover, working on the solutions will provide you with the necessary practice in problem solving that are essential in this course.

VI. **Quizzes, Mid-terms and Final Exam:**

A total of 9-10 quizzes, three (3) midterms and a final examination will be administered during the Fall semester. There will NOT be any make-up on quizzes, midterm tests or the finals, but two of the lowest quiz scores will be dropped. The finals will be comprehensive and mandatory. In addition, you will also take an ACS Examination for General Chemistry. This exam includes topics covered in both Chem 1A and Chem 1B. Dates for quizzes, midterms, the ACS and final exams are indicated in the class schedule (in this syllabus). If there is a conflict to any of these dates due to a prior commitment, please let me know one week before the quiz or midterm is scheduled, so that an earlier date can be arranged. If you missed any of the quizzes or examinations due to sickness, please bring a doctor’s note with you on your next attendance. (Study guides for the ACS Exam are available in the library (reserved section). If you borrow these study guides, please treat them with care.)

VI. **Laboratory**

In this class you will perform a total of 12 experiments and you are required to write a complete laboratory report on each experiment. The Lab report must be turned in within one week the experiment is completed. Points will be deducted from late reports. During lab you may perform an experiment with a partner and you will be sharing the experimental data. However, all lab reports must be written individually. Each student is responsible for writing and turning in his/her own lab reports. DO NOT copy (plagiarize) your partner’s or other student’s lab reports. You will be given a “zero” for your lab reports if it is determined that you have plagiarized other people’s work.

***Please read the following guideline for the laboratory preparation and for writing lab reports:***

1. You must read the experiment and complete the pre-lab exercises before coming to the class. Pre-laboratory exercises must be turned in at the beginning of the lab period. You WILL NOT be allowed to perform the experiment if you have NOT read the experiment or done the pre-labs.

2. You MUST have a lab notebook that is dedicated strictly for your laboratory work and it should not be used as a lecture note book. The lab notebook is where you keep records of all experimental data (measurements and/or observation). (You will be asked to leave the class if you come without a lab notebook and the grades for that experiment will be forfeited.

**3. Prepare your lab notebook as follows:**

* Start on a new page for each experiment and write the *Title*, *Objective*, *Overview*,  *the* *Procedure* (outline or summarize), and *Data Table* (in this order).
* If you do not have the time to write the *Overview* before coming to the lab, leave enough space to write this after the lab period. However, you MUST write the *Title*, *Objective*, and outline of *Procedure*, before you are allowed to proceed with the experiment.
* Prepare the *Data Table* before starting the experiment. Data must be entered directly into the lab notebook in INK. No pieces of paper or pencil will be tolerated.

4. At the end of the lab period, please show your data before leaving the class. Your laboratory instructor may ask you to complete some of the calculations before allowing you to leave.

5. The final lab reports must be written and organized in the format that I have specified in this syllabus (attached). Otherwise, they will not be graded.

6. The complete lab reports must be turned in within one week the experiment is completed. If you do not type your lab reports, please turn in the original copy or the photocopy of the original. Carbon copies will NOT be accepted. Lab reports that are more than 3 weeks overdue will NOT be graded.

VIII. **Safety in the Laboratory**

1. Safety in the laboratory is of primary importance. You must wear safety goggles at all time during laboratory classes, regardless of whether you are doing an experiment or not.

2. Eating and drinking are NOT ALLOWED in the laboratory (Bottle drink is OK).

3. You must wear close-toed shoes. Sandals or flip-flops are NOT allowed in the chemistry labs.

4. You must wear clothing that protects your body. Shorts, short skirts, and sleeveless shirts/blouse are not allowed. Avoid wearing flammable synthetic materials. Do not wear contact lenses.

5. Do experiment that is assigned by the instructor. Any kind of unauthorized experimentation with chemicals is strictly prohibited.

VII. **Reading/Studying**

* It is crucial that you read the chapter before coming to class. If you come to class without knowing what topic(s) the lecture will cover, you will not gain anything during the lecture.
* You must pay attention during lectures and study the materials outside the class periods. Studying is not the same as reading. It is an active process, which includes summarizing concepts in your own words and memorizing formulas, as well as solving problems. You must do the homework assignments to fully grasp the concept(s) covered during each lecture.
* In this class you should expect to spend 10-12 hours per week outside class periods to read and review materials, do homework assignments, and write lab reports. Additional hours may be needed to study for quizzes or examinations.

# VIII. Academic Decorum and Attendance

* Attendance in lectures and labs are important and will be recorded. Be sure to sign the attendance sheets. Please contact me if you find yourself in a situation that might cause you to miss more than two lecture periods. You are strongly encouraged to take notes during lectures and participate during class discussions. Do Not do your homework assignments during lectures.
* Be punctual! If you arrive late, enter quietly. If you have to leave the class before the end of the period, please be seated where you can leave with the minimum disruption to the class.

please turn off smart phones, i-pads, tablets and laptops during lectures

Please respect the desire of others to learn. Therefore, please DO NOT TALK during lectures. If you have any questions regarding the lecture materials, please raise your hand.

# IX. Integrity

* All work submitted for grading must be your own. Copying is cheating and is an unacceptable behavior. Cheating during quizzes, tests, or examinations will NOT be tolerated and it will earn you an automatic zero for those quizzes or examinations.
* Be a full and active participant when you work on an assignment with others. If you just copy the groups or your partner's data, you haven't learned anything and you are wasting your time.

**Academic Calendar for Fall 2015**

August 22 M Fall Semester Classes Begin

August 27 S Saturday Classes Begin

September 4 Su Last Day to Drop Full-Term Credit Classes and Receive a Refund

September 4 Su Last Day to Drop Full-Term Classes without a “W” on Transcript

September 4 Su Last Day to Add Regular Session Classes

**September 5 M Labor Day Holiday**

September 6 T Census Day: Enrollment Verification Day

September 9 F Last Day to File for PASS/NO PASS Grading option

October 21 F Last Day to file petitions for AA**/**AS Degrees or Certificates

**November 11 F Veteran’s Day Holiday**

November 18 F Last Day to Drop Classes and receive a "W" on Transcript

November 18 F Attendance Verification Day

Nov 24 – 26 Th-S Thanksgiving Holiday

December 12-16 M-F Final Exam Week

December 16 F Fall Semester Ends

**Chem 1B Fall 2016 Tentative Schedules for Lectures, Labs, Quizzes, and Midterms**

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Wk Date Lect/Lab/Quiz Lecture/Lab Topics

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1 08/22 Lecture 1 Course Outline; Chemical Equilibrium (13.1 - 13.3)

08/24 *Lab-1* Lab Safety Video and Safety Quiz;

08/26 Lecture 2 Chemical Equilibrium (13.4 - 13.7)

2 08/29 Lecture 3 Acids and Bases (14.1 – 14.5)

08/31 *Lab-2* \*Expt-B2: *Le Chatelier’s Principle*

09/02 Lecture 4 Acids and Bases (14.6 – 14.12); ***Quiz #1*** (Chap-13)

3 09/05 No Class Labor Day Holiday

09/07 *Lab-3* Expt-B3: *Determining an Equilibrium Constant*

09/09 Lecture 5 Acid-Base Equilibria and Buffer Solution (15.1 – 15.2);

4 09/12 Lecture 6 Buffers and Acid-Base Titrations (15.3 – 15.5); ***Quiz #2*** (Chap-14)

09/14 *Lab-4* Expt-B4: *Acid-Base Equilibrium and Buffer Solutions*

09/16 Lecture 7 Solubility Equilibria (16.1 – 16.2);

5 09/19 Lecture 8 Solubility Equilibria (16.3); ***Quiz #3*** (Chap-15)

09/21 *Lab-5* Expt-B5: *Acid-Base Titration pH-Curve*

09/23 **Test #1** (Chapters 13, 14 & 15; scantron is needed)

6 09/26 Lecture 9 Chemical Kinetics (12.1 – 12.4)

09/28 *Lab-6* Expt-B6 – *Solubility Product Constant*

09/30 Lecture 10 Chemical Kinetics (12.5 – 12.7) ***Quiz #4*** (Chap-16)

7 10/03 Lecture 11 Entropy and Spontaneity (17.1 – 17.5)

10/05 *Lab-7* Expt-B1: *The Rate of an Iodine Clock Reaction*

10/07 Lecture 12 Entropy and Spontaneity (17.6 – 17.9); ***Quiz* #*5*** (Chap-12)

8 10/10 Lecture 13 Electrochemistry (18.1 – 18.4)

10/12 *Lab-8* Expt-B7: *Thermodynamics of the Borax Solubility*

10/14 Lecture 14 Electrochemistry (18.5 – 18.7) ***Quiz #6*** (Chap-17)

9 10/17 Lecture 15 Electrochemistry (18.8 – 18.9); Test Review

10/19 *Lab-9* Expt-B8: *Oxidation-Reduction Reactions*

10/21 **Test #2** (Chapters 12, 16, and 17; scantron is needed)

10 10/24 Lecture 16 Nuclear Chemistry (19.1 – 19.4)

10/26 *Lab-10* Expt-B9: *Electrochemical Cells*

10/28 Lecture 17 Nuclear Chemistry (19.5 – 19.7); ***Quiz #7*** (Chap-18)

11 10/31 Lecture 18 Trends of Atomic Properties (20.1)

11/02 *Lab-11* Expt-B11: *Qualitative Analysis of Cations*

11/04 Lecture 19 Representative Elements (20.2 – 20.5) ***Quiz #8*** (Chap-19)

12 11/07 Lecture 20 Representative Elements (20.6 – 20.9);

11/09 *Lab-12* Expt-B12: *Qualitative Analysis of Anions*

11/11 No Class Veteran’s Day Holiday

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Wk Date Lect./Lab/Quiz Lecture/Lab Topics

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13 11/14 Lecture 21 Representative Elements (20.10 – 20.14) ***Quiz #9*** (Chap-20)

11/16 Lecture 22 Work sheets and Test Review

11/18 Lecture 23 Transition Metals and Coordination Compounds (21.1 – 21.3);

14 11/21 **Test #3** (Chapters 18, 19, & 20; scantron is needed)

11/23 No Lab

11/25 No Class Thanksgiving Break

15 11/28 Lecture 24 Complex Ions & Metallurgy (21.4 – 21.8);

11/30 *Lab-14* \*Expt-B13: *Thermochemistry of Complex Ion*

12/02 Lecture 26 Hydrocarbons: Alkanes, Alkenes, Alkynes, Benzene (22.1 – 22.3);

16 12/05 Lecture 25 Compounds with Functional Groups (22.4); ***Quiz #10*** (Chap-21)

12/07 **ACS Exam** (It accounts for 20% of your final exam grades)

12/09 Lecture 27 Final Review; (Last day to turn in lab reports for experiments B12 & B13.

All other lab reports will not be accepted.)

17 12/12 **Final Exam** (Comprehensive: 12, 14, 15, 18 & 21 are very important)

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# (All experiments require formal lab write-up, except those marked with asterisks (\*))

# (All formal lab reports must be typed with 1.5 spacing, and please use a font no smaller than size 10, except for the calculations and chemical equations, which may be hand-written. Please write everything in INK. Pencil should NOT be used in report writing.)

# Formal Lab Reports MUST BE ORGANIZED according to the following format:

# Title of experiment;

# Objective(s)

# Overview

# Procedure

# Data Table(s)

# Calculations (including error analysis if applicable)

# Results Summary

Homework Assignments for Chem 1B Fall 2016

Textbook: Chemistry by Zumdahl & Zumdahl, **9th Edition**.

Chapter-13: 15, 21, 24, \***27**, 30, 32, 40, \***45**, 49, \***51**, \***53**, 59, \***61**, 65, \***68**, 72, \***78**, 82, \***85**, 96, \***98**, \***102**, 105, \***106**, \***115**. (Due: 9/02/2016)

Chapter-14: 38, \***48**, 51, 56, 61, \***67**, \***70**, \***73**, 75, 87, 91, \***97**, 101, \***107**, 109, \***119**, 131, 136, 137, \***146**, \***147**, \***149**, 175, \***180**, \***187**. (Due: 9/12/2016)

Chapter-15: \***21**, 25, 27, \***35**, \***38**, \***41**, 44, 45, 46, \***53**, \***57**, 59, \***61**, 65, \***67**, 80, \***83**, \***84**, 85, \***96**, 99, 102, 110, 117, \***119**. (Due: 9/23/2016)

Chapter-16: \***22**, 25, \***28**, 30, \***37**, 40, 44, 49, \***51**, \***53**, 58, \***63**, \***64**, 66, \***72**, \***73**, 77, \***81**, 83, 89, 90, 100, \***101**, 107, \***111**. (Due: 9/30/2016)

Chapter-12: 23, 26, 27, 29, \***30**, 34, \***36**, \***37**, 41, \***42**, 48, \***51**, \***54**, 58, 61, \***68**, 70, \***75**, \***78**, \***91**, 92, 93, \***108**, \***113**, 115. (Due: 10/07/2016)

Chapter-17: \***32**, 34, \***36**, 40,\* **41**, 45, \***47**, \***53**, 55, \***57**, 58, \***62**, \***68**, 71, 74, \***75**, 79, \***88**, \***89**, 97, 105, 108, \***112**, \***119**. (Due: 10/14/2016)

Chapter-18: \***29**, \***31**, \***37**, \***39**, 45, 50, 51, \***61**, \***69**, 71, \***77**, 82, \***84**, 88, \***89**, 92, \***93**, \***96**, \***98**, 101, 107, 111, 119, \***131**, \***149**. (Due: 10/28/2016)

Chapter-19: \***11**, 12, \***17**, 19, 21, \***22**, 24, \***26**, 32, \***34**, 36, \***37**, \***39**, 42, \***45**, \***50**, 55, 66, \***67**, 70, 72, 77, \***81**, \***84**, 88. (Due: 11/04/2016)

Chapter-20 \***11**, \***12**, 13, \***20**, 23, 28, \***29**, 37, 38, 48, \***51**, \***56**, 63, \***66**, \***68**, 70, \***73**, 76, 77, \***78**, 79, \***97**, 102, \***104**, \***110**. (Due: 11/14/2016)

Chapter-21: \***21**, \***24**, 31, 32, \***35**, \***37**, 39, \***40**, \***45**, 46, \***51**, \***54**, 59, 60, \***62**, \***65**, \***73**, 75, 78, 79, \***81**, \***91**, 99, \***101**. (Due: 11/28/2016)

Chapter-22: \***13**, \***14**, 18, 19, \***21**, 22, 25, \***26**, \***28**, 29, 30, 31, \***32**, 39, \***43**, 47, \***51**, \***52**, \***55**, 57, \***61**, \***62**, \***65**, 72, 75. (Due: 12/12/2016)

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Important notes on homework:

* You’re advice to attempt all problems listed above. However, problems in **bold** type with asterisks (\*) are those that will be graded; other problems are for practice.
* Show all work/calculations clearly and in an organized manner – if calculations are not provided you will not receive any credit for your work.
* Do not cramp your work – have empty lines between problems. If I cannot find or follow your work, it will not get graded.
* Re-write the questions for problems that require you to indicate the number of significant figures, non-algebraic problems that involve only mathematical operations, or those asking classifications of matter.

Homework Assignments for Chem 1B Fall 2015

Textbook: Chemistry by Zumdahl & Zumdahl, **8th Edition**.

Chapter-13: 15, 21, 24, 27, 30, 32, 40, 45, 49, 51, 53, 59, 61, 65, 68, 82, 88, 92, 95, 97, 99, 100, 103, 104, 111. (Due: 9/04/2015)

Chapter-14: 36, 46, 49, 54, 59, 65, 71, 73, 85, 89, 95, 99, 107, 117, 127, 132, 133, 139, 147, 148, 153, 167, 172, 179. (due: 9/14/2015)

Chapter-15: 17, 21, 23, 34, 37, 40, 43, 45, 47, 51, 53, 55, 59, 61, 63, 65, 75, 77, 79, 84, 87, 97, 99, 107, 109. (Due: 9/25/2015)

Chapter-16: 19, 22, 25, 28, 30, 35, 38, 42, 47, 49, 51, 55, 59, 61, 64, 69, 70, 71, 87, 89, 91, 92, 96, 99, 105. (Due: 10/02/2015)

Chapter-12: 21, 24, 25, 27, 28, 32, 33, 35, 38, 46, 48, 50, 55, 58, 61, 62, 64, 69, 72, 79, 85, 92, 93, 100, 107. (Due: 10/09/2015)

Chapter-17: 28, 30, 32, 36, 37, 43, 49, 51, 52, 54, 58, 61, 62, 65, 68, 71, 77, 78, 79, 88, 97, 104, 107, 111. (due: 10/16/2015)

Chapter-18: 35, 37, 43, 48, 49, 57, 61, 65, 67, 70, 76, 78, 80, 85, 89, 92, 94, 96, 105, 119, 125, 132, 143, 147, 149. (Due: 10/30/2015)

Chapter-19: 11, 12, 15, 17, 19, 22, 24, 30, 33, 35, 38, 40, 41, 46, 51, 53, 59, 60, 61, 68, 69, 72, 75, 78, 82. (due: 11/06/2015)

Chapter-20 11, 12, 13, 20, 24, 30, 31, 32, 37, 39, 46, 49, 50, 54, 55, 61, 63, 69, 72, 76, 86, 88, 98, 101, 106. (Due: 11/20/2014)

Chapter-21: 17, 20, 31, 32, 35, 37, 39, 40, 43, 44, 47, 50, 55, 56, 58, 61, 71, 76, 83, 87, 90, 91, 101, 102. (Due: 12/03/2015)

Chapter-22: 13, 14, 18, 19, 21, 22, 25, 26, 28, 29, 30, 31, 32, 39, 43, 47, 51, 52, 55, 57, 60, 61, 65, 72, 75. (Due: 12/14/2015)

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Important notes on homework:

* Show all work/calculations clearly and in an organized manner – if calculations are not shown you will not receive any credit for your work.
* Do not cramp your work – have empty lines between problems. If I cannot find or follow your work, it won’t get graded.
* Some of the problems/exercises in chapter 2 require you to write either the names or the formulas of compounds. Be sure you **write both** name and formula for each compound.
* Many problems in chapter-22 require you to either write the names or drawing structures of organic compounds. Be sure you write both the name and structure for each compound.

Laboratory Notebooks and Laboratory Reports

**Laboratory Notebook**

Science is not a list of facts that you have to memorize. It is a process that involves gathering information and collecting data, analyzing those data, providing critically thinking and discussion what all those data and information mean, and then arriving at some conclusion based on the information and data collected. Whatever conclusion that one has arrived based on data collected in one study or set of studies will be tested and verified by another set of studies (similar or otherwise). Therefore, scientists must keep records of the methodology and results of their experiments so that they can be repeated, checked and verified by others. Their experiments and experimental results, as well as the conclusions, are compiled in a dedicated **laboratory notebook.** Like those scientists, you are required to keep a laboratory notebook that is dedicated for the laboratory component of this class. You will record all experimental data, observations and results (including calculations) in this lab notebook. Your laboratory instructor will inform you the type of notebooks that may be used for this class. In general, your laboratory notebook must have a carbon copy, so that as you turn a set of experimental data and results for grading, you still have a copy of the data. You must keep your laboratory notebook ***neat*** and ***organized***. Your laboratory notebook should only be used for this purpose; it should NOT be used as a lecture notebook or for working on homework assignment problems.

The following is a guideline how you will be expected to organize and maintain your laboratory notebook:

1. Your laboratory notebook MUST be permanent bound notebooks; loose or spiral bound notebooks are not acceptable.
2. Leave the first 2-3 leaves of the notebook for table of contents. As you begin an experiment, you should enter the number and title of the experiment and the pages it is located in the notebook.
3. Start on a fresh page for each experiment:
   1. **Title**: At the top of this page, write the Number and Title of the experiment, and the date the experiment is carried out;
   2. **Objective:** Write the Objective statement of the experiment in a complete sentence;
   3. **Overview:** Write the experimental overview. (If you don’t have time to do this, leave the rest of the first page and the next one for you to write the Overview later.) If you are planning to type your final lab report, skip this Overview section in the Lab Notebook, but you will write the Overview in the final lab report;
4. **Procedure**: On the third page (if you are not going to type your report) OR after the Objective (if you are going to type your report for this experiment), write the Procedure: list all the steps involve in the experiment in chronological order that is easy for you to follow during the experiment – numbering the experimental steps would make sense. You will refer only to your laboratory notebook to perform the experiment, and not to the lab manual;
5. **Data Tables:** After the Procedure section, prepare one or more Data Tables as necessary. All experimental data must be organized in tabulated format and properly labeled; leave enough spaces for data entry, possible errors and corrections. DO NOT cramp your data or make the data entry all over the place. (You MUST make sure that your laboratory instructor is able to find your entry within seconds.)
6. **Data Entry**: All data and observation MUST be entered directly into your laboratory notebook in non-erasable INK; scratch papers and pencils will NOT be permitted in the laboratory. Data values must contain significant figures consistent with the precision of the measuring devices. For examples, masses obtained on a centigram balances must contain two (2) digits after the decimal point, but masses obtained on an analytical balance must have four (4) digits after the decimal point. Volumes obtained using graduated cylinders must contain only one (1) digit after the decimal point, but those obtained using burets or pipets must have two (2) digits after the decimal points.
7. **Calculation**: Show all calculations wherever and whenever required. Organize and properly label each calculation. Round off the final answers to the correct number of significant figures.
8. **Result Summary**: briefly state what you have discovered/determined in this experiment and whether the objective of the experiment is achieved. Give reason(s) if it is not – provide possible source(s) of errors. (Note: You are not required to write this section in the laboratory notebook if you type your final lab report.)

**Laboratory Reports**

You are encouraged to type your final laboratory reports. It would make your reports look neat and professional, and easy to read. Regardless, each final laboratory report must be organized in the following format, which must be strictly adhered to:

1. **Your Name**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Partner(s)**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Experiment Number and Title**
2. **Objective:**
3. **\*Overview:**
4. **Procedure Summary:**
5. **Data:**
6. **Calculation:**
7. ♣**Error Analysis** (if applicable)
8. **Result Summary**

**\*Overview**:

An “Overview” is a brief summary that explains the chemical concept/principle of the experiment. If the experiment involves one or more chemical reactions, you must write the balance equations for those reactions and provide explanations that will link the outcome of those reactions to the objective. Mention what data will be collected during the experiment and what calculations will be carried; provide the mathematical formulas or equations that will be used in the calculations.

However, if the primary objectives of the experiment are to observe chemical reactions and to write balanced equations of those reactions, then you do not have to write any equations in the *Overview*. Do not write the detail of the experimental procedure in the Overview section.

♣**Error Analysis** (only if applicable)

Mean and standard deviation are calculated using the following formulas:

*Mean* () = ; *Standard deviation* = 

where *Xi* are individual data values and is the mean of the sum of *Xi*

If the true or acceptable value of the quantity determined in the experiment is known, express the accuracy of your result in term of percentage error, such that:

% Error =  x 100

Sometimes, for limited data the precision of experimental results maybe expressed in the form of *Percent Relative* *Deviation* (PRD), where

PRD =  x 100

[Note: not every experiment will require an error analysis. Your laboratory instructor will inform you which experiments require error analyses.]

An Example of Laboratory Report:

Title: Chemical Kinetic – Iodine-Clock Experiment

Objective

In this experiment we will determine the rate law and the activation energy of an iodine-clock reaction between peroxodisulfate and iodide ions. The effect of catalyst on reaction rate will also be observed.

Overview/Concept of Experiment

The rate law for the following reaction will be studied:

S2O82- + 3 I– → 2 SO42- + I3–; (Eqn-1)

For which the rate law is: Rate = *k*[S2O82–]*x*[I–]*y*

where *k* is the rate constant and *x* and *y* are the rate order with respect to each reactant. To obtain the rate law for the reaction, we need to determine the rate constant *k* and the rate orders *x* and *y*. The rate order *x* will be determined by varying [S2O82–], while keeping [I-] constant. Similarly, the rate order *y* will be determined by varying [I-] while keeping [S2O82–] constant.

\*(Provide all the equations that allow you to derive the values of the rate orders *x* and *y*.)

The kinetic study in this experiment also requires the determination of the initial rate of Eqn-1. To accomplish this, Eqn-1 is coupled with Eqn-2 below:

I3– + 2 S2O32– → 3 I– + S4O62–; (Eqn-2)

Adding Eqn-1 and Eqn-2 yields the net equation (Eqn-3):

S2O82– + 2 S2O32– → 2 SO42– + S4O62–; (Eqn-3)

Eqn-2 indicates that as long as S2O32– is present, I3– will not accumulate and the dark-blue I2-starch complex will not form. Since the initial concentration of S2O32– is much lower than that of S2O82–, the former is quickly used up, which than allows I3– to accumulate and resulting in the appearance of dark-blue solution due to I2-starch complex. Using the reaction stoichiometry of Eqn-3 we can the initial rate of this reaction (Eqn-1) as follows:

Initial Rate =  =  = 

Where t and [S2O32–]*i* is the initial concentration of S2O32– in the reaction mixture and t is the elapsed time between the mixing of solutions and the appearance of dark blue I2-starch complex.

Temperature is kept constant throughout the determination of rate law. Once the rate orders *x* and *y* are known, the rate constant *k* can be calculated from the measured rates and the initial concentration of each reactant (in Eqn-1). The effect of temperature on rates will be determined by measuring reaction rates at different temperatures using the same set of concentrations. While the effect of catalyst will be done by comparing rates of reaction at constant temperature in the present and absent of a catalyst. The detail of the calculations to determine *x, y* and *k* is given in the lab manual: General Chemistry 1B laboratory Manual.

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**Five Major Reasons Why Students Fail Chemistry**

**1. Insufficient Math Preparation**

Math, especially algebra, is an essential tool in chemistry. To be able to solve chemistry problems requires that you understand basic algebra and you must have the ability to transform word problems into mathematical expression. If you think that your math is a bit rusty, get help immediately. Don’t wait until you’re halfway through the semester.

**2. Not Getting of Reading the Text.**

Textbook and lab manual are NOT optional items in the chemistry class. Even if the lectures are fantastic, you’ll need the text to do the homework assignments. The best way to understand the lectures is to read the chapter before coming to each lecture. Some or many of you may come to the lab without reading the experiment that you’ve been assigned to do. That will be a big mistake because you’ll be doing the experiment without actually understanding it and you’ll missed the entire concept of the experiment.

**3. Procrastination**

If you intend to pass and do well in chemistry you MUST study the lecture materials and do the homework promptly. NEVER put off studying and doing the homework assignment until you are halfway through the semester. It will be too late and you will never catch up. If you miss the basics, you’ll get yourself into trouble. To master chemistry you must understand the concept. This requires that you study and do the homework on a daily basis. Build the concept a little at a time. Set aside a small segment of time each day for chemistry. It will help you gain a long-term mastery. Do not cram at the last minute.

**4. Not Doing Your Own Work**

Homework assignments are helpful if you do the exercises yourself. Study guides and solution manuals are useful only if you use them for help or for checking your work, but not as an easy way to get your homework done. Don’t let a book or someone else do your work for you. They won’t be available during the tests, which will account for a big portion of your grade.

**5. Psyching Yourself Out**

You must have a positive attitude toward chemistry. If you truly believe you will fail you may be setting yourself up for a self-fulfilling prophecy. If you have prepared yourself for the class, you must feel confident (but not over confident) that you will succeed.

Berkeley City College

Chem 1B, Fall 2015

Student’s Academic Survey

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \*Email:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(write clearly)

1. What is your academic major or career goal?

2. When and where did you take Chemistry 1A (or its equivalents)?

3. What is your academic load this semester (in number of units)? \_\_\_\_\_\_\_units

4. What is your workload (nonacademic) in hours per week? \_\_\_\_\_\_\_\_hrs/wk

5. Which learning styles apply to you? (Select all that are applicable)

(a) Visual

(b) Auditory or Verbal

(c) Visual and Verbal

(d) Tactile/Kinestatic (or hands on)

6. Rank the following topics discussed in Chem 1A from 1 to 5 (1 = very easy and 5 = most difficult).

(a) Atomic Structure and Periodic Properties; ( 1 2 3 4 5 )

(b) Bonding Theories and Molecular Structures; ( 1 2 3 4 5 )

(c) Properties of Gases, Liquids, and Solids; ( 1 2 3 4 5 )

(d) Mole Relationships and Stoichiometry; ( 1 2 3 4 5 )

(e) Solution Properties and Compositions; ( 1 2 3 4 5 )

(f) Thermochemistry and Enthalpy of Reaction; ( 1 2 3 4 5 )

7. What are you major concerns in this class?

8. Is there anything about you that I should know, such as special learning needs?

(Any information given to me will be treated as confidential matters)