Experiment - 1

Required for Physical Pharmacy and Pharmaceutics Laboratory

Required Materials:

1. Texts: Dutta S.K., Principles of Physical Pharmacy and Biophysical Chemistry Martin A.N., Physical Pharmacy
2. Laboratory Notebook – bound and duplicate numbered pages
3. Long white laboratory gowns
4. Set of metric weights
5. Box of cleansing tissues
6. Graph papers

Laboratory Procedure:

1. All experiments will be performed by pairs or 3 in a group. Each student must record data in his or her own Laboratory Notebook and prepare an **individual report** to be submitted.
2. A full comprehension of the assigned work will be expected of each student prior to the actual experimentation. In this manner, a student can plan his or her work for completion within the assigned time-schedule.
3. Students are expected to observe proper laboratory etiquette, conduct and attire.
4. Proper laboratory techniques learned in other courses must be practiced.
5. Many experiments require the use of delicate and expensive equipments and, as such, **special care must be taken** under these circumstances.
6. Laboratory cleanliness in the working areas will be strongly encouraged.
7. Equipment signed out must be returned clean and dry before leaving the laboratory.
8. Students **must check out** with the laboratory instructor before leaving the laboratory.

Laboratory Notebook: The following rules must be adhered to:

1. Each page must be dated.
2. All experimental data must be the **original record**; and not copies of date originally recorded on separate pieces of paper. If some sacrifice of neatness is necessary to adhere to this rule, then it is a worthwhile sacrifice.
3. Besides data, any observations and calculations made should be included in your notebook.
4. A **carbon copy of your data** must be submitted **before leaving** for the day. **No data should be accepted at a later date**.

Laboratory Report:

The laboratory report must be handled in at a previously announced time, generally one week after the experiment had been performed. Failure to submit reports on time will prevent proceeding to the next experiment and also will result in a lower grade for the report.

The report should include:

1. A brief statement as to the purpose of the experiment
2. A description of the experimental procedure, concise enough to be repeated by another person
3. Tabulation of raw data and calculated data.
4. Sample calculations
5. Neatly drawn and labeled graphs
6. Conclusions
7. Literature references.

EQUIPMENT LIST

Name:_____

Section No._____ **Desk No.**_____

(For instructor's use)

S. No.	Quantity	Equipment		Size
1	1.	Burette with Teflon plug	-	50 mL
2	1.	Volumetric pipette	-	50 mL
3	2.	Volumetric pipette	-	25 mL
4	1.	Volumetric pipette	-	10 mL
5	2.	Volumetric pipette	-	5 mL
6	2	Volumetric pipette	-	2 mL

Table *Contd…*

S. No.	Quantity	Equipment		Size
7	2	Volumetric pipette	-	1 mL
8	1	Volumetric pipette	-	1 mL
9	1	Graduated pipette	-	10 mL
10	1	Volumetric flask	-	500 mL
11	2	Volumetric flask	-	250 mL
12	2	-do-	-	100 mL
13	2	-do-	-	50 mL
14	1	Erlenmeyer flask	-	500 mL
15	2	-do-	-	250 mL
16	2	-do-	-	100 mL
17	2	-do-	-	50 mL
18	2	Funnel	-	1(medium) + 1 (small)
19		Thermometer	-	
20		Water-bath with rings	-	1 pc
21		Tripod	-	1
22		Bunsen burner with tubing	-	
23		Stirring rods	-	
24		Wash bottle fittings	-	Large + small
25		Spatula, spoon type	-	
26		Weighing bottles	-	
27		Burette clamps	-	

Students should have with them the following items (purchased):

1. Test tube brush (2) Detergent (3) Glass-marking pencil (4) Wire-gauge 6” x 6”

Student’s signature (in)

Instructor’s signature (in) Date

Student’s signature (out)

Instructor’s signature (out) Date

Experiment - 1A

Calibration of a Thermometer

1. Since a major portion of the laboratory exercises in this course involves measurement of weight, volume, temperature, concentrations, etc. demonstrations of proper techniques, to be used in **all** laboratories, will be given by the instructor(s). You will be expected to continue to use these techniques throughout the year and subsequent years of your professional career.
2. Thermometer Calibration: The purpose of this experiment is to acquaint the student(s) with the fact that no instrument is absolutely accurate.

   The objective of this experiment is to calibrate a thermometer at two places on its range. This is done using the ice point and boiling point of water, taking into account the necessary corrections.

Procedure:

(a) ***Ice-point determination:*** A 100 mL beaker is filled with chopped ice. The temperature is determined with the thermometer supplied employing good stirring. Several readings are to be taken (and recorded in the notebook) until successive readings are constant. The use of a towel wrapped around the beaker will act as insulation. Does it make a significant difference? If yes, why? Experimental and theoretical ice-points temperatures are then compared.

(b) ***Boiling point determination:*** A wash bottle, made of glass, is modified by removing the delivery tubing (i.e. the longest piece of tubing) and replacing it with the thermometer supplied. The depth of the thermometer is adjusted so as to minimize steam and steam-convection without risking the danger of splashing water on to the thermometer. It is to be ensured that there is an opening to the atmosphere and that boiling chips are used before heating the water.

The temperature read on the thermometer and the temperature of the emergent stem are recorded. After stem corrections the experimental and theoretical boiling points are compared.

Barometric pressure is to be noted and the corrected pressure and the corrected boiling point of water at that pressure are recorded in the notebook.

SUMMARY

The corrections which would be necessary in using the laboratory thermometer are to be recorded and used to get a correct reading.

This process is known as calibration which is required for calibrating each and every equipment such as burette, pipette, weight box, etc. which are required for routine laboratory and research works.

Experiment – 1B

Statistical Evaluation of the Data

The purpose of this experiment is to enable the student to use simple statistical procedures in evaluating the data generated.

Procedure:

Accurately measure 100.00 mL of water (may be with the help a standardized burette or pipette in a 100.00 mL graduate) and the content is transferred carefully into the 250 mL beaker that was supplied, allowing all of the water to drain into the beaker. The meniscus is marked by placing a line-mark with a glass-marking pencil and the beaker is emptied of its contents. The beaker is filled up with water up to its calibration mark and the volume of its contents is measured with the 50 mL graduate (estimated to the nearest 0.5 mL).

The process is repeated ten times.

Calculate the mean, median, mode, standard deviation and standard error of the experiment.

Do your results follow a normal distribution curve?