

Problem Set 2

Reading for Today's Lecture

Introduction to Chemical Principles Chapter 2.1 – 2.4

Reading for Tuesday's Lecture

Introduction to Chemical Principles Chapter 2.5 – 2.6

Practice Problems

Chapter 2: 2, 7, 17.

Additional Problems

1. Categorize each of the following common problems as giving rise to a systematic or random error:
 - a) An sample being weighed is hygroscopic; absorbs Water from the Air..
 - b) A radioactive sample undergoing decay has its decay products counted repeatedly, without change in sampling conditions. Each trial yields a slightly different count over the same period of time.
2. The following are typical errors which can occur when making a Mass measurement on an Analytical Balance; a high quality balance. Identify each as Systematic or Random.
 - a) The pan enclosure doors are not closed.
 - b) The balance is not located on a solid counter.
 - c) The balance is not leveled.
3. An analyst reports his analytic method produced a result which is 4% off from the National Institute of Standards and Technology (NIST) reported standard value. He is expressing confidence in the:
 - a) accuracy of his measurement.
 - b) precision of his measurement.
 - c) accuracy and precision of his measurement.Explain your reasoning.
4. The boiling point of Ethanol was determined by a student to be 77.1°C. What is the percentage error for this result? The *Merck Index* reports the boiling point of Ethanol to be 78.5°C.

5. A student reports his measured value of the density of a sample is too low by 7%. If the accepted value for the density is 0.74 g/mL, what was the student's measured result?

6. The numerical value for π is approximately:

3.14159265358979323846

a) What is the percentage error introduced if we use the value 3.14 for π ?

b) Numerically π can be estimated by the ratio 22/7. What is the percentage error introduced if we use this value for π ?

7. A certain type of paper used for stationary is referred to as "twenty pound" because a ream (500 sheets) of 17" x 22" paper weighs 20 lb. Suppose the manufacturer prepares a ream for which each dimension was 5% systematically too large. How much will the ream weigh?