Advanced Placement Chemistry

Chapter 1 Problems: 13, 16, 20, 24, 25, 27 – 31, 43, 45, 47, 54, 57, 59, 61, 65, 70, 77

Chapter 1 – Chemical Foundations

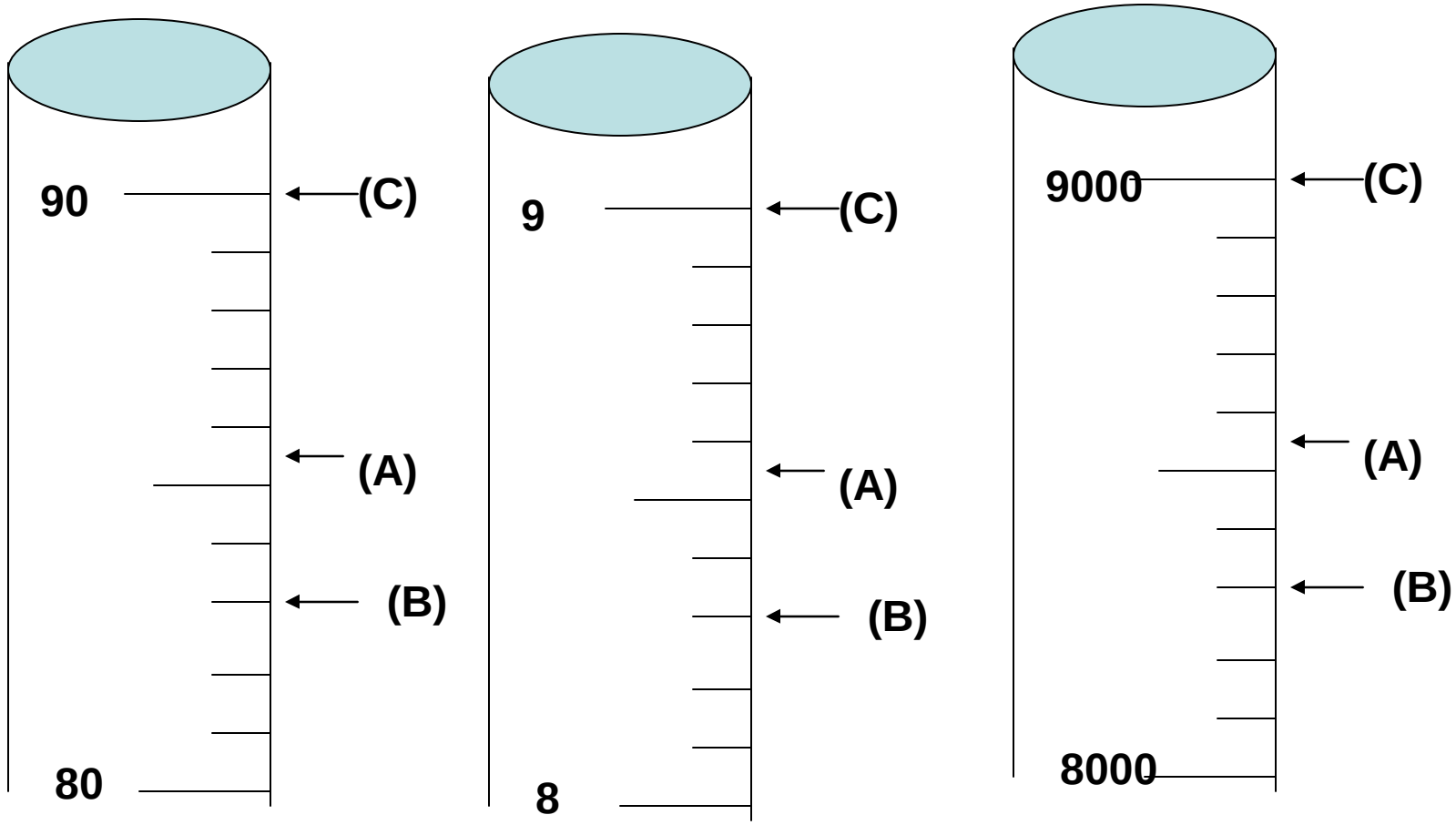
Chemistry – The study of matter and how it reacts

Careers as a chemist:

1. **Analytical Chemist – Measure the quantity of a substance present**
2. **Chemical Engineer – Design chemical factory for producing chemicals.**
3. **Biochemist –**
4. **Polymer Chemist**
5. **Environmental Chemist**

Know the Metric Prefixes on p. 9

Uncertainty – Every measured number is written to 1 uncertain digit.



Problem: Which is more uncertain? 25 ml or 25.00 mL?

Precision – refers to how reproducible a measurement is.

Accuracy – refers to how close a measurement is to what it should be

Significant Figures (Measured Numbers)

1) non-zero digits are significant
2) Zero's: 3 kinds
   a) leading zero's are not measured
   b) captive zero's are measured
   c) trailing zero's are measured only if there is a decimal in the measured number

Exact numbers are definitions or integers, and have infinite sig figs.

e.g. 3 apples is exact
12 inches in 1 foot is exact

Manipulating measured numbers:

<u>Multiply or divide:</u> answer is rounded to the least number of sig figs in the problem.

<u>Add or Subtract:</u> Answer is rounded to the greatest uncertainty in the problem.

Factor Label (Dimensional Analysis)

Problem: Convert 10.0 km to miles, given that 1 inch = 2.54 cm.

Problem: Your speedometer reads 65 miles/hour. How many km/minute?

Your car gets 15 km/Liter of gasoline. What is your mileage in miles/gallon?

(1 Liter = 1.06 qt)

Temperature conversions:

F = 1.8 C + 32 (where 1.8 is an exact number)

K = 273 + ^{o}C

Convert 98.6 ^{o}F to Kelvin

Density – Relationship of a substances mass to its volume. Used as a tool for identifying unknown substances.

Problem: A yellow metal weighs 0.696 pounds/in^3. The density of gold is 19.3 g/cm^3. Is this yellow metal gold?

Classification of matter:

3 common states of matter – **solid**
liquid
gas

Mixture – 2 kinds

homogenous – same throughout (tea with sugar dissolved)
heterogeneous – different throughout (ice cubes in ice tea)

Physical change – change state of matter (melt ice)

Chemical change – change 1 substance into another. (burn a match)