

## Chapter One (1.1-1.3) Study Guide Answers

### Concepts

1. Know the different classifications of matter including the different types of pure substances and mixtures and how they are distinguished from one another
2. Know the difference between physical and chemical properties and changes
3. Know the names and symbols of the elements required by Blackmer (1-18 and P as of 9/8/05)
4. Know the difference between an intensive and extensive property
5. Know the law of constant composition (law of multiple proportions)

### Outline

I. Definition of Chemistry- Study of matter and the changes it undergoes

II. States of Matter

A. Solid- fixed state and fixed composition; condensed state (defined volume)

B. Liquid- specified volume, indefinite shape; condensed state; fluid

C. Gas- neither specified volume or shape; fluid

III. Kinds of Changes

A. Physical Changes- a substance changes its physical appearance, but not its composition; ex. Evaporation of water

B. Chemical Changes- a substance is transformed into a chemically different substance

IV. Classifications of Matter

A. Mixtures

1. Homogeneous Mixtures- a mixture that is a combination of pure substance; one phase that can be separated by a physical change; solution

2. Heterogeneous Mixtures- 2+ phases (distinct states of matter) that can be separated by a physical change

B. Pure substances

1. Compounds- composed of 2+ elements

2. Elements- cannot be decomposed into simpler substances

V. Definitions

A. Physical Property- can be measured without changing identity and composition of a substance. Ex. Color, odor, density, melting/freezing/boiling point, hardness

B. Chemical Property- describes the way a substance may change or react to form other substances. Ex. flammability

C. Intensive Property- not dependent on amount of sample being examined. Ex. Temperature, melting point, density

D. Extensive Property- dependent on quantity of sample, relates to amount of substance present. Ex. Mass, volume.

### Practice Problems

- Which one of the following is not a physical property of water?
  - It boils at 100°C at 1 atm pressure
  - It freezes at 0°C at 1 atm pressure
  - It is clear and colorless
  - Water exists in solid, liquid and gaseous forms
  - It reacts rapidly with potassium metal to form potassium hydroxide**
- What is the physical state in which matter has no specific shape but does have a specific volume?
  - gas
  - solid
  - liquid**
  - salts
  - ice
- Circle any of the following that are not considered a chemical change.
  - rotting wood
  - crushing ice**
  - boiling water**
  - iron rusting
- True/False.** Saltwater is an example of a homogeneous mixture.
- Give the proper symbol for the following elements.

Sodium	___Na___
Oxygen	___O___
Carbon	___C___
Phosphorus	___P___
Magnesium	___Mg___
Boron	___B___
- Give the proper element name for the following symbols.

Si	___Silicon___
Cl	___Chlorine___
Be	___Beryllium___
F	___Fluorine___
Ar	___Argon___

7. Of the following, only \_\_\_\_\_ is an extensive property.
- density
  - mass**
  - boiling point
  - freezing point
  - pressure
8. Homogeneous mixtures are also known as \_\_\_\_\_.
- solids
  - compounds
  - elements
  - substances
  - solutions**
9. The radius of the bromine atom is 1.14 Angstroms. How many of these atoms will span a distance of 52.17 cm? (1 Angstrom =  $10^{-10}$  m)
10. Which of the following is a chemical property of sodium chloride?
- It melts at a high temperature
  - It is a solid at room temperature
  - It dissolves in water
  - It can be decomposed into sodium metal and chlorine gas**
  - It is not significantly compressible
11. An element cannot \_\_\_\_\_.
- Be part of a heterogeneous mixture
  - Be part of a homogeneous mixture
  - Be separated into other substances by chemical means**
  - Interact with other elements to form compounds
  - Be a pure substance
12. Gases and liquids share the property of \_\_\_\_\_.
- Compressibility
  - Definite volume
  - Incompressibility
  - Indefinite shape**
  - Definite shape
13. In the following list, only \_\_\_\_\_ is NOT an example of matter.
- Planets
  - Light**
  - Dust
  - Elemental Phosphorus
  - Table salt

