

Name: _____

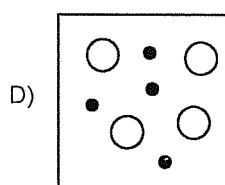
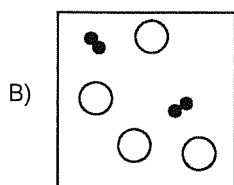
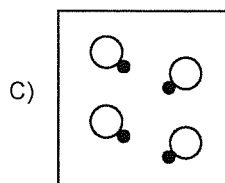
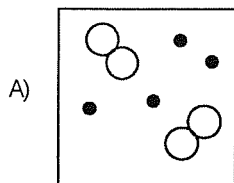
___ 1) Which species represents a chemical compound?

- A) NH_4^+ B) Na C) NaHCO_3 D) N_2

___ 2) Which terms are used to identify pure substances?

- A) a solution and a mixture C) an element and a mixture
B) a solution and a compound D) an element and a compound

___ 3) Which particle diagram represents one pure substance, only?

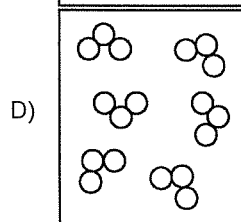
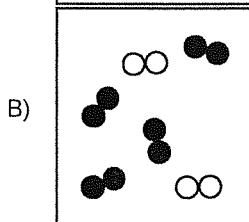
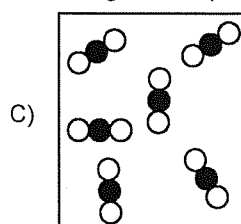
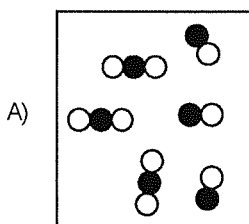


___ 4) Given the simple representations for atoms of two elements:

○ = an atom of an element

● = an atom of a different element

Which particle diagram represents molecules of only one compound in the gaseous phase?



___ 5) Which substance can be decomposed by a chemical change?

- A) Cu B) Cr C) Co D) CO

___ 6) Which substance can *not* be decomposed by a chemical change?

- A) H_2O B) Ne C) HF D) N_2O

___ 7) Which must be a mixture of substances?

- A) gas B) liquid C) solid D) solution

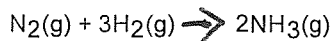
___ 8) When a mixture of water, sand, and salt is filtered, what passes through the filter paper?

- A) water, sand, and salt C) water, only
B) water and salt, only D) water and sand, only

- ___ 33) Which subatomic particle has *no* charge?
A) alpha particle
B) neutron
C) electron
D) beta particle
- ___ 34) Which statement concerning elements is true?
A) All atoms of a given element must have the same mass number.
B) Different elements must have different numbers of neutrons.
C) All atoms of a given element must have the same atomic number.
D) Different elements must have different numbers of isotopes.
- ___ 35) The atomic number of an atom is *always* equal to the number of its
A) protons plus electrons
B) neutrons, only
C) protons, only
D) protons plus neutrons
- ___ 36) A neutral atom contains 12 neutrons and 11 electrons. The number of protons in this atom is
A) 11 protons
B) 1 proton
C) 23 protons
D) 12 protons
- ___ 37) What is the total number of protons in the nucleus of an atom of potassium-42?
A) 15
B) 42
C) 19
D) 39
- ___ 38) The atomic mass of an element is the weighted average of the masses of
A) all of its naturally occurring isotopes
B) its two most abundant isotopes
C) all of its radioactive isotopes
D) its two least abundant isotopes
- ___ 39) An atom of helium-4 differs from an atom of lithium-7 in that the atom of helium-4 has
A) one more proton
B) two less neutrons
C) two less protons
D) one more neutron
- ___ 40) The nucleus of an atom of cobalt-58 contains
A) 27 protons and 31 neutrons
B) 27 protons and 32 neutrons
C) 60 protons and 60 neutrons
D) 59 protons and 60 neutrons
- ___ 41) What is the mass number of the nuclear symbol ${}^{19}_{9}\text{F}$?
A) 28
B) 9
C) 10
D) 19
- ___ 42) All the isotopes of a given atom have
A) different mass numbers and different atomic numbers
B) the same mass number but different atomic numbers
C) different mass numbers but the same atomic number
D) the same mass number and the same atomic number
- ___ 43) Which two notations represent atoms that are isotopes of the same element?
A) ${}^{121}_{50}\text{Sn}$ and ${}^{119}_{50}\text{Sn}$
B) ${}^{39}_{17}\text{Cl}$ and ${}^{39}_{19}\text{K}$
C) ${}^{19}_{8}\text{O}$ and ${}^{19}_{9}\text{F}$
D) ${}^{121}_{50}\text{Sn}$ and ${}^{121}_{50}\text{Sn}$
- ___ 44) When a lithium atom forms an Li^+ ion, the lithium atom
A) loses a proton
B) gains an electron
C) loses an electron
D) gains a proton
- ___ 45) An oxide ion (O^{2-}) formed from an oxygen-18 atom contains *exactly*
A) 10 protons, 8 neutrons, 8 electrons
B) 8 protons, 8 neutrons, 10 electrons
C) 8 protons, 10 neutrons, 8 electrons
D) 8 protons, 10 neutrons, 10 electrons
- ___ 46) How many electrons are contained in an Au^{3+} ion?
A) 197
B) 82
C) 76
D) 79

- 70) What is the molecular formula of a compound that has a molecular mass of 54 and the empirical formula C_2H_3 ?
- A) C_8H_{12} B) C_6H_9 C) C_4H_6 D) C_2H_3

- 71) Given the reaction:



What is the mole-to-mole ratio between nitrogen gas and hydrogen gas?

- A) 2:3 B) 1:2 C) 1:3 D) 2:2

- 72) Given the reaction:



What is the ratio of moles of CO_2 produced to moles of C_2H_6 consumed?

- A) 2 to 1 B) 7 to 2 C) 3 to 2 D) 1 to 1

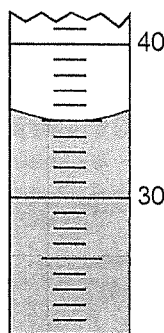
- 73) A student intended to make a salt solution with a concentration of 10.0 grams of solute per liter of solution. When the student's solution was analyzed, it was found to contain 8.90 grams of solute per liter of solution. What was the percent error in the concentration of the solution?

- A) 18.9% B) 1.10% C) 11.0% D) 8.90%

- 74) A student calculated the percent by mass of water in a hydrate as 14.2%. A hydrate is a compound that contains water as part of its crystal structure. If the accepted value is 14.7%, the student's percent error was

- A) $\frac{0.5}{14.7} \times 100$ B) $\frac{0.5}{14.2} \times 100$ C) $\frac{14.2}{14.7} \times 100$ D) $\frac{14.7}{14.2} \times 100$

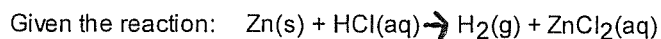
- 75) The diagram below represents a portion of a 100-milliliter graduated cylinder.



What is the reading of the meniscus?

- A) 35.0 mL B) 44.0 mL C) 45.0 mL D) 36.0 mL

- 76) A student wishes to investigate how the reaction rate changes with a change in concentration of $HCl(aq)$.



- (a) Identify the independent variable in this investigation.
- (b) Identify *one* other variable that might affect the rate and should be held constant during this investigation.