AP Chemistry **Name** _____

Worksheet Fall Semester Review **Period** _____

Write the number next to the word that fits the paragraph.

Measurement in Chemistry

Science knowledge is advanced by observing patterns, (1), and constructing explanations, (2); which are supported by repeatable (3) evidence.

Measurements are made using the metric system, where the standard units are called (4) units, which are based on the meter, kilogram, and second as the basic units of length, mass, and time, respectively. The SI temperature scale is the (5) scale, although the (6) scale is frequently used in chemistry. The metric system employs a set of prefixes to indicate decimal fractions or multiples of the base units; k (10^{-3}), c (10^{-2}), m (10^{-3}), m (10^{-4}) and n (10^{-9}).

All measured quantities are inexact to some extent. The (7) of a measurement indicates how closely different measurements of a quantity agree with one another. The (8) of a measurement indicates how well a measurement agrees with the accepted value. Significant figures indicate the level of (9) in a measurement. Significant figures in a measured quantity include one (10) digit, the last digit of the measurement. Calculations involving measured quantities are reported with the appropriate number of significant figures. In multiplication and division, the (11) of significant figures is used. In addition and subtraction, the (12) of the least accurate significant figure is used. Relative difference between a measured value and an accepted (true) value is called (13). Relative spread of multiple measurements is called (14).

Mass and volume measure (15) of matter. Density relates mass to volume in the equation, (16). Chemical processes involve interaction of (17), which are measured in (18). The number of particles in a mole is called Avogadro's number, (19). This number is based on using periodic table masses to be equal to mass of formula unit labeled in (20). (21) is the sum of atomic masses in the chemical formula. The mass of one molecule of H_2O, for example, is 18.0 u, so the molar mass of H_2O is 18.0 g.

In the dimensional analysis approach to problem solving, we keep track of units as we carry measurements through calculations. The given units are multiplied by a series of conversion factors, which are (22) of equivalent quantities. After canceling out units algebraically, what remain are the target units.

Atomic Nature of Matter

Atoms are the basic building blocks of matter; they are the smallest units of an element that can combine with other elements. Atoms are composed of even smaller subatomic particles. Experiments led to the discovery and characterization of subatomic particles. (1) experimented with cathode rays in magnetic and electric fields, which led to the discovery of the electron and its (2) ratio. (3), working with oil-drops in a vacuum to determined the (4) of the electron. (5) observed the scattering of α particles by gold metal foil and concluded that atoms have a dense, (6) nucleus.

The atom's nucleus contains (7) and (8), whereas (9) move in the space around the nucleus. The charges of subatomic particles in terms of the charge of a proton, +1, are: electron (10) and neutron (11). Masses in terms of the mass of a proton, 1, are: neutron (12), and electron $\approx$ 0.

Elements are classified by atomic number or *Z* value equals the number of (13). The mass number or *A* value is the sum of protons and (14). Atoms of the same element that differ in mass number are called (15).

In a neutral atom, the number of protons equals the number of electrons. An (16) is formed when the number of electrons and protons are not equal.

The unified atomic mass unit, *u*, is 1/12 the mass of a C-12 atom. The average atomic mass of an element is calculated using the formula: $100m_{av}$ = (17).

The two kinds of pure substances are (18), which are identified by a chemical symbol and (19), which are composed of two or more elements joined chemically and identified by a chemical formula, which shows the composition. Molecular compounds have a defined size, whereas crystalline compounds are unbounded, where their formula shows the (20) of atoms in the compound.

(21) are composed of multiple pure substances in an object or container and have variable composition. They can be homogeneous or heterogeneous. Homogeneous mixtures are also called (22) and are uniform throughout.

Radioactivity

There are four kinds of radioactive decay: emission of (1) particles (α or $^{4}_{2}He$), (2) particle (β or $^{0}_{-1}e$), (3) particle (β^{+}, $^{0}_{1}e$), and (4) radiation ($^{0}_{0}\gamma$).

In nuclear equations, reactant and product nuclei are represented by $^{A}_{Z}X$, called a (5) symbol. In a balanced equation the sum of reactant *A* values equals the sum of product *A* values and the sum of reactant *Z* values equals the sum of product *Z* values.

Modes of decay can be predicted by comparing the number of neutrons with the average. In general, neutron-rich nuclei tend to emit (6) particles; neutron-poor nuclei tend to emit (7) particles and nuclei above *Z* = 83 tend to emit (8) particles.

Nuclear (9), induced conversions of one nucleus into another, can be brought about by bombarding nuclei with either charged particles or neutrons.

The rate of decay (radioactivity) is rate = (10). The time for half of the radioactive atoms to decay is constant, $t_{½}$ = (11). The time it takes radioactive atoms to decay is determined by using the formula kt = (12).

Electron Structure—Bohr Model

The electronic structure of an atom describes the energies and arrangement of electrons around the atom. Much of what is known about the electronic structure of atoms was obtained by observing atomic (1), which is the radiant energy emitted or absorbed by matter. Radiant energy equals: E_{photon} = (2).

	% deviation
	% difference
	6.02×10^{23}
	accuracy
	amount
	Celsius
	certainty
	$d = m/V$
	estimated
	experimental
	grams
	Kelvin
	laws
	Molar mass
	moles
	number
	particles
	position
	precision
	ratios
	SI
	theories
	$\%_1 m_1 + \%_2 m_2$
	1
	0
	-1
	charge
	charge/mass
	compounds
	electrons
	elements
	ion
	isotopes
	Millikan
	Mixtures
	neutrons
	neutrons
	positive
	protons
	protons
	ratio
	Rutherford
	solutions
	Thomson
	alpha
	alpha
	beta
	beta
	gamma
	$ln(N_o/N_t)$
	nuclear
	positron
	positron
	kN_t
	$(ln2)/k$
	transmutations
	absorbed
	Bohr
	emitted
	$E_{n\text{-}final} - E_{n\text{-}initial}$