Washu chemistry review flashcard

Contents

- Masses of Atomic Components

1. Precision

A measure of how closely individual measurements agree with one another.	Accuracy
Refers to how closely individual measurements agree with the correct or true value.	Significant Figures: Digits that are significant:
2. Non-zero digits are always significant. 3. Any zeros between	Rules for Using Significant Figures: For addition and subtraction:

two non-zero digits are significant.

4. A final zero or trailing zeros in the decimal portion *ONLY* are significant.

the answer should have the same number of decimal places as the term with the fewest decimal places.	Rules for Using Significant Figures: For multiplication and division:
the answer should have the	Rules for Using Significant

same number of significant figures as the term with the fewest number of significant figures.	Figures: In multi-step calculations:
you may round at each step or only at the end.	Rules for Using Significant Figures: Exact numbers, such as integers, are treated as if…
…as if they have an infinite number of significant figures.	Rules for Using Significant Figures: In calculations, round up if : round down if: If the first discarded digit is 5, then round up if:

	round down if:
In calculations, round up if the first digit to be discarded is greater than 5 and round down if it is below 5. If the first discarded digit is 5, then round up if a nonzero digit follows it, round down if it is followed by a zero.	Significant Figures: Addition and Subtraction: 12. 793 + 4. 58 + 3. 25794 = 20. 63094 sig figs?
With significant figures it is20. 63since4. 58has 2 decimal places, which is the least number of	Significant Figures: Multiplication and Division. 56. 937/0. 46 = 130. 29782609

decimal places.	sig figs?
With significant figures, the final value should be reported as1. 3 x 10^{2} since0. 46has only 2 significant figures. Notice that130would be ambiguous, so scientific notation is necessary in this situation.	Even though the_____occupy most of the volume of the atom, they hold only a_____percentage of the atom's mass. The_____is incredibly dense and contains almost all of the mass of the atom. Actually nuclear densities are approximately 10^{14} times that of normal matter.
electronsoccupy most of the	The____/ ____occupies the

volume of the atom, they hold only avery smallpercentage of the atom’s mass.

Thenucleusis incredibly dense and contains almost all of the mass of the atom. Actually nuclear densities are approximately 10 ^{14} times that of normal matter.	majority of the atom. This___is actually over __ % of the volume of the atom.
Theelectron cloudoccupies the majority of the atom. Thiscloudis actually	**Masses of Atomic Components** in kg: p $^{+}$, proton mass:

over99% of the volume of the atom.	n ^{o} , neutron mass: e $^{–}$, electron mass:

Masses of Atomic Components

p $^{+}$, proton mass: 1. 67262 x 10 $^{-27}$ kgn ^{o} , neutron mass: 1. 67493 x 10 $^{-27}$ kge $^{–}$, electron mass: 9. 1094 x 10 $^{-31}$ kg	Mass Number (A)
This is the total number of protons plus the number of neutrons (i. e., the total number of	The atomic number (Z) is:

nucleons).

(A = # of

protons + # of

neutrons)

Z= is the A=

number of

protons.

The atomic

number often is

not included

because the

element name

(or element

symbol) also

tells the number

of protons.

If the number of

protons

changes, then it

becomes a

different

element.

For example,

helium will

always have 2 protons; if you add a proton then it becomes lithium (Li).	
Mass Number	Z=
Atomic Number	In a neutral atom, the number of electrons must equal....
the number of protons. However if the atom has a non-zero charge, the number of electrons does not equal Z, and the atom is referred to as	If an atom has a non-zero charge, the number of electrons does not equal Z, and the atom is referred to as an ___

an ion.	
ion	Ion:
a charged atom produced by adding or removing an electron or electrons to or from a neutral atom.	Cation
a positively charged ion.	Anion
a negatively charged ion.	[image]
Atomic #, mass, chemical symbol, element name	[image]
The mass number (A = # of protons + #	[image]

of neutrons) is four. This is the total number of protons plus the number of neutrons (i. e., the total number of nucleons). The atomic number (Z) is 2 and is the number of protons. T

There are 35 protons, 45 neutrons and since it is neutral there are 35 electrons.	[image]
There are 47 protons, 61 neutrons and 44	[image]

electrons.	
There are 34 protons, 45 neutrons, and 36 electrons.	[image]
There are 27 protons, 32 neutrons, and 23 electrons.	mass of a proton in amu
1. 00728 u	mass of a neutron in amu
1. 00867 u	mass of an electron in amu
5. 5 *10^-4 u	Three processes that change the # of subatomic particles in an atom
1. Ion Formation (Ionization) 2. Isotope	Ion Formation (Ionization)

Conversion

3.

Transmutation

Changing the # of Electrons in an atom	Isotope Conversion
Changing the # of neutrons in the nucleus of an atom	Transmutation
Changing the # of protons in the nucles. This converts one element into another	Isotope Conversion and Transmutation occur only in _____reactions, not in normal _____reactions.
Isotope Conversion and Transmutation occur only in ___nuclear__reactions, not in	chemical reactions

normal __chemical___reactions.	
processes in which the # of electrons held or shared by an atom change	nuclear reactions
processes that involve changing the # of neutrons or protons held in the nucleus of an atom	missing mass
the difference between the experimental and calculated mass of an isotope	The missing mass has been converted into _____/___/____
nuclear binding	nuclear binding

energy	energy
energy that holds the nuclear particles together. This is the energy that would be required to separate the nucleus into its constituent protons and neutrons.	Avogadro's #
6. 022 x 10^{23} particles	1 mole contains the same number of particles as there are in ________.
12g of carbon-12 atoms by definition	1 mole contains the same number of particles as

	there are in 12g of carbon-12 atoms by definition. This number is called; _______ and is equal to ______.
Avogadro's number or *Avogadro's constant* (N_A) and is equal to 6. 022 x 10^{23} particles.	The nuclear binding energy is related to the missing mass via Einstein's famous equation (from the Theory of Special Relativity):
E= mc^2	E= mc^2 E= m=

	c=
E= nuclear binding energy m= mass (in the case of nuclear binding energy equation it is the missing mass) c= speed of light, 2. 9979*10^8 m/s	c= speed of light=
2. 9979*10^8 m/s	The elemental atomic mass is the ……. It is nothing more than a…..
The elemental atomic mass is theatomic mass that appears in the periodic table. It is	Isotop e

nothing more than aweighted average of the isotopic masses of all the naturally occurring isotopes.

atoms of the same element that differ in the number of neutrons in the nucleus and therefore they have different masses. Nevertheless isotopes have practically identical properties in terms of chemical	Elemental Atomic Mass=

reactivity.

[image]	[image]
i= an index identifying each isotope for the element f= fractional abundance of isotope i m= mass of isotope i	The atomic mass of a specific atom or molecule is determined by using an experimental technique called_____.
Mass spectrometry	Mass spectrome try: this technique…..
separates the different isotopes of atoms to allow determination of the percent abundance or	In a mass spectrum, each isotope appear as a ___in the mass spectrum. The ___(___) of each ____

isotopic composition of the element in the given sample.	depends on the _____of that isotope in the sample and the unique location of the ___on the x-axis indicates the ______of the isotope.
In a mass spectrum, each isotope appear as a _peak__in the mass spectrum. The _intensity__(__height_) of each __peak__ depends on the __abundance___ of that isotope in the sample and the unique location of the __peak_on the	

x-axis indicates

the ___mass-to-

charge(m/q)___o

f the isotope.