Review Sheet Chemistry
Lester BIOL 150

General things to do to prepare for the exam:

- **study the PowerPoints**
- **write out the answers to the learning objectives found with each PowerPoint**
- **listen to my lecture recordings**

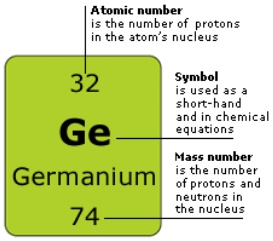
Chapter 2

Distinguish and define the following pairs of terms: neutron and proton, atomic number and mass number, atomic weight and mass number.

Define an electron. Do you know exactly where they can be found around an atom?

Differentiate matter from element. What are some of the characteristics of elements? In other words, what makes an element, an element?

Be able to interpret an atomic symbol such as (without the labels of course!):



Define isotope.

Define radioactive isotope. Describe the 3 types of energy/particles that are released during radioactive decay.

What happens to atoms with incomplete valence shells (missing electrons)?

Differentiate a molecule from a compound from a mixture.

Describe the following types of chemical bonds: covalent (polar and nonpolar), hydrogen bonds, ionic, and van der Waals.

How many pairs of electrons are being shared in a: single, double, and triple covalent bonds?

Define: electronegativity, and ion.

Describe how molecular shape determines how most molecules recognize and respond to each other.

Sample Exam Questions Chapter 2:

About 25 of the 92 natural elements are known to be essential to life. Which 4 of these 25 elements make up approximately 96% of living matter?

A) carbon, sodium, hydrogen, nitrogen
B) carbon, oxygen, phosphorus, hydrogen
C) oxygen, hydrogen, calcium, nitrogen
D) carbon, hydrogen, nitrogen, oxygen

Which of the following statements is TRUE?

A) Carbon, hydrogen, oxygen, and calcium are the most abundant elements of living matter.
B) Some naturally occurring elements are toxic to organisms.
C) All life requires the same essential elements.
D) A patient suffering from a goiter should not consume seafood.

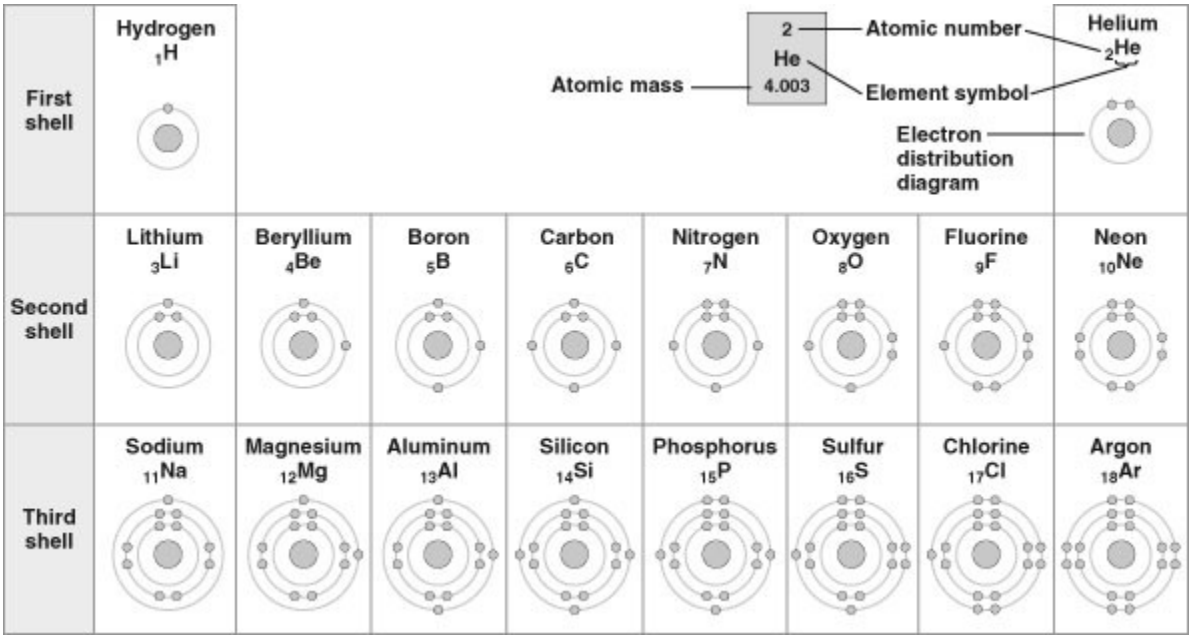
Which of the following are compounds?
A) H_2O, O_2, and CH_4 B) H_2O and O_2
C) O_2 and CH_4 D) H_2O and CH_4, but not O_2

An ion with six protons, seven neutrons, and a charge of 2+ has an atomic number of _____.
A) four B) five C) six D) seven

A(n) _____ has charge but negligible mass, whereas a(n) _____ has mass but no charge.
A) proton; neutron B) neutron; proton C) neutron; electron D) electron; neutron

Can the atomic mass of an element vary?
A) No, it is fixed; otherwise a new element will be formed.
B) Yes. Adding or losing electrons will substantially change the atomic mass.
C) Yes. Adding or losing protons will change the atomic mass without forming a different element.
D) Yes. Adding or losing neutrons will change the atomic mass without forming a different element.

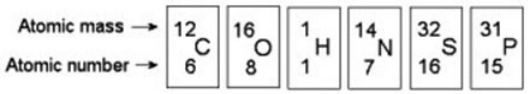
Refer to the following figure (first three rows of the periodic table) to answer the two questions below.



What element does not prefer to react with other elements?
A) hydrogen
B) helium
C) beryllium
D) both hydrogen and beryllium

Which pair of elements would likely have similar valency and thus similar chemical behavior?
A) nitrogen and phosphorus
B) carbon and nitrogen
C) sodium and chlorine
D) hydrogen and helium

Refer to the following figure to answer the two questions below.



How many electrons are present in a Phosphorus 3+ atom?
A) 16 B) 12 C) 19 D) 34

Oxygen has an atomic number of 8 and, most commonly, a mass number of 16. Thus, what is the atomic mass of an oxygen atom?
A) approximately 8 grams B) approximately 8 daltons
C) approximately 16 grams D) approximately 16 daltons

When are atoms most stable?
A) when they have the fewest possible valence electrons
B) when they have the maximum number of unpaired electrons
C) when all of the electron orbitals in the valence shell are filled
D) when all electrons are paired
What is the maximum number of covalent bonds that an oxygen atom with atomic number 8 can make with hydrogen?
A) 1 B) 2 C) 4 D) 6

Bonds between two atoms that are equally electronegative are _____.
A) hydrogen bonds B) polar covalent bonds
C) nonpolar covalent bonds D) ionic bonds

A covalent bond is likely to be polar when _____.
A) one of the atoms sharing electrons is more electronegative than the other atom
B) the two atoms sharing electrons are equally electronegative
C) carbon is one of the two atoms sharing electrons
D) the two atoms sharing electrons are of the same elements

How many electron pairs are shared between carbon atoms in a molecule that has the formula C_2H_4?
A) one B) two C) three D) four

If an atom has a charge of +1, which of the following must be true?
A) It has two more protons than neutrons. B) It has the same number of protons as electrons.
C) It has one more electron than it does protons. D) It has one more proton than it does electrons.

Which of the following correctly describes *chemical equilibrium*?
A) Forward and reverse reactions continue with no net effect on the concentrations of the reactants and products.
B) Concentrations of products are higher than the concentrations of the reactants.
C) There are equal concentrations of products and reactants while forward and reverse reactions continue.
D) There are equal concentrations of reactants and products, and the reactions have stopped.