

48 pts

## Atomic Structure

1. (3 pts) Indicate whether each of the following statements is true or false. If a statement is false, correct the statement so that it becomes true.

a. Most materials occur in nature as pure substances.

F *Few*

b. A given compound *usually* contains the same relative number of atoms of its various elements.

F *always*

c. Atoms are made up of tiny particles called molecules.

F

2. (6 pts) Write the formula for each of the following substances, listing the elements in the given order.

a. A molecule containing one phosphorus atom and three chlorine atoms.  $\text{PCl}_3$

b. A molecule containing two boron atoms and six hydrogen atoms.  $\text{B}_2\text{H}_6$

c. A molecule containing one calcium atom for every two chlorine atoms.  $\text{CaCl}_2$

d. A molecule containing one carbon atom and four bromine atoms.  $\text{CBr}_4$

e. A molecule containing two iron atoms and three oxygen atoms.  $\text{Fe}_2\text{O}_3$

f. A molecule containing three hydrogen atoms, one phosphorus atom and four oxygen atoms.  $\text{H}_3\text{PO}_4$

3. (3 pts) Fill in the information below

Proton: symbol =  $p^+$  mass =  $1$  charge =  $+$  location = nuc.

Neutron: symbol =  $n$  mass =  $1$  charge =  $0$  location = nuc.

Electron: symbol =  $e^-$  mass =  $0$  charge =  $-$  location =  $e^-$  cloud.

4. (2 pts) True or false. Atoms of the same element have the same number of neutrons but different numbers of protons are called isotopes.

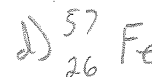
5. (3 pts) How did Dalton's atomic theory have to be modified after the discovery that several isotopes of an element may exist?

#2

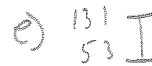
#5

6. (6 pts) Write the atomic symbol ( ${}^A_Z\text{X}$ ) for each of the isotopes described below.

a.  $Z = 8$ , number of neutrons = 9



b. The isotope of chlorine in which  $A = 37$

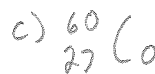


c.  $Z = 27$ ,  $A = 60$

d. Number of protons = 26, number of neutrons = 31

e. The isotope of I with a mass number of 131.

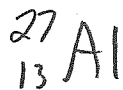
f.  $Z = 3$ , number of neutrons = 4



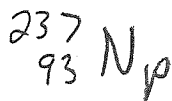
## Subatomic Particles

1. (6 pts) Write the symbols,  ${}^A_Z X$ , for the following isotopes.

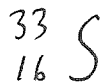
Aluminum – 27



neptunium – 237



sulfur – 33



2. (19 pts) Fill in the following blanks below

Symbol	at. #	at. Mass	# p <sup>+</sup>	# n	# e <sup>-</sup>
${}^{201}_{80}\text{Hg}$	<u>80</u>	<u>201</u>	<u>80</u>	<u>121</u>	<u>80</u>
${}^{89}_{38}\text{Sr}$	38	89	<u>38</u>	<u>51</u>	<u>38</u>
${}^{31}_{15}\text{P}$	<u>15</u>	<u>31</u>	15	16	<u>15</u>
${}^{40}_{18}\text{Ar}$	<u>18</u>	<u>40</u>	<u>18</u>	22	18
${}^{24}_{12}\text{Mg}^{2+}$	<u>12</u>	<u>24</u>	<u>12</u>	<u>12</u>	<u>10</u>
${}^{76}_{34}\text{Se}^{2-}$	34	<u>76</u>	<u>34</u>	42	36
${}^{65}_{29}\text{Cu}$	29	<u>65</u>	<u>29</u>	36	<u>29</u>
${}^{207}_{82}\text{Pb}^{2+}$	<u>82</u>	<u>207</u>	82	125	80
${}^{76}_{33}\text{As}^{3-}$	<u>33</u>	<u>76</u>	<u>33</u>	<u>43</u>	<u>36</u>