

# Homework 2 Answer Key

Chapter 2 - 35, 37, 38, 39, 40, 45, 55, 57, 58, 60,  
61, 63, 56, 59, 71, 72, 75, 77, 79, 81,  
85, 88, 89, 91, 99, 102

38) Identify the elements in each chemical formula and tell how many of each are present.

a.  $K_2Cr_2O_7$   
Potassium dichromate

K	Potassium	2
Cr	Chromium	2
O	oxygen	7

b.  $C_5H_8NNaO_4$   
Monosodium glutamate  
(MSG)

C	Carbon	5
H	hydrogen	8
N	nitrogen	1
Na	Sodium	1
O	oxygen	4

c.  $C_{10}H_{16}N_2O_3S$   
vitamin B<sub>7</sub>

C	Carbon	10
H	hydrogen	16
N	nitrogen	2
O	oxygen	3
S	Sulfur	1

40) Identify the element that fits each description

a. an alkali metal in period 6  $\Rightarrow$  Cs Cesium

b. a noble gas in period 6  $\Rightarrow$  Rn Radon

c. a main group element in period 3 that has p-orbitals half-filled with electrons

$\Rightarrow$  P Phosphorus

d. a transition metal in period 4, group 11.

$\Rightarrow$  Cu Copper

e. an inner transition metal with its 5f orbitals completely filled with electrons.

$\Rightarrow$  Lr Lawrencium

f. a transition metal in period 6, group 10

$\Rightarrow$  Pt Platinum

56) The three most common isotopes of tin have mass numbers of 116, 118, and 120. For each isotope, give the following information:

a. The number of protons

	116	118	120
$P^+$	50	50	50
$n^0$	66	68	70
$e^-$	50	50	50
	IVA	IVA	IVA
	$^{116}_{50}\text{Sn}$	$^{118}_{50}\text{Sn}$	$^{120}_{50}\text{Sn}$

b. The number of neutrons

c. The number of electrons

d. The group number

e. The element symbol (nuclid)

58) Give the number of protons, neutrons and electrons in each element:

	$P^+$	$n^0$	$e^-$
a. Silver-115	47	68	47
b. $^{197}\text{Au}$	79	118	79
c. $^{222}\text{Rn}$	86	136	86
d. $^{192}\text{Os}$	76	116	76

60) Write the element symbol that fits each description. Use a superscript for the mass number and a subscript for the atomic number.

a. an element that contains 10 protons and 12 neutrons



10 protons = Ne

10 + 12 = mass number

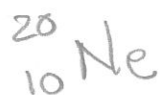
b. an element with atomic number 24 and mass number 52.



c. an element with 10 electrons and 10 neutrons.

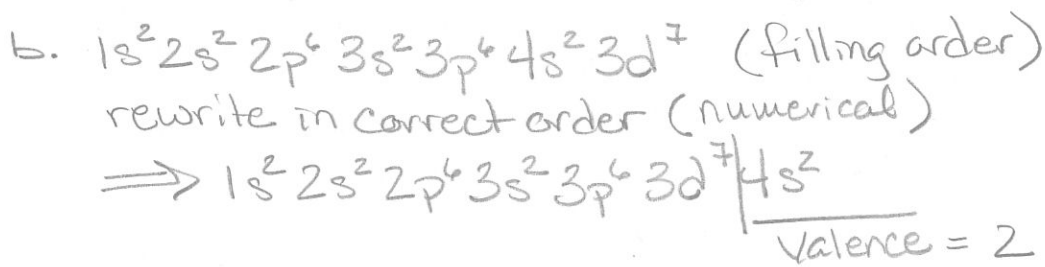
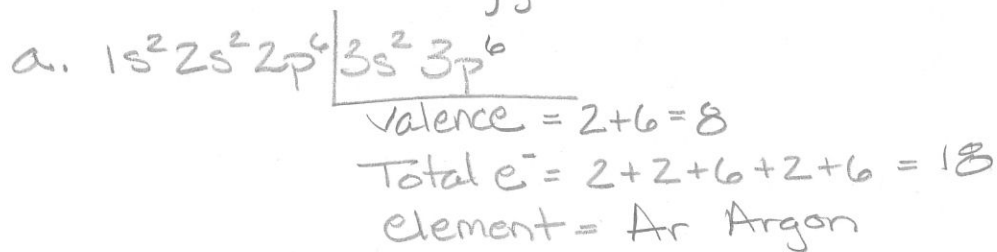
$10e^- = 10\text{ protons} = \text{Ne}$

$10n + 10p^+ = 20\text{ mass number}$

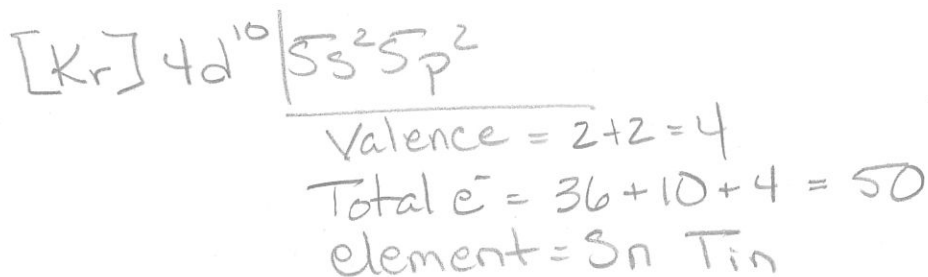
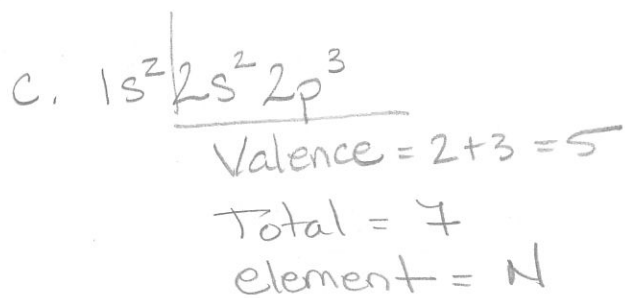


72) Give the total number of electrons, the number of valence electrons, and the identity of the element with each electronic configuration

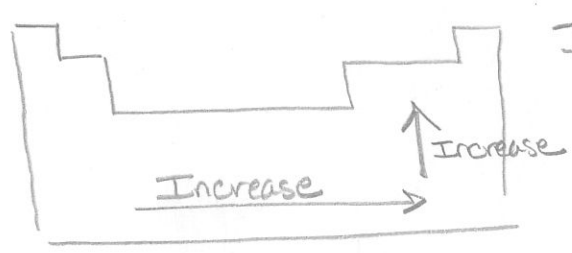
\* valence  $\Rightarrow$  only those in highest principal energy level



Total  $e^- = 27$   
 element = Co Cobalt

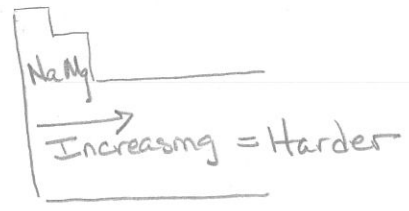


88) For each pair of elements in Problem 86, label the element from which it is easier to remove an electron.

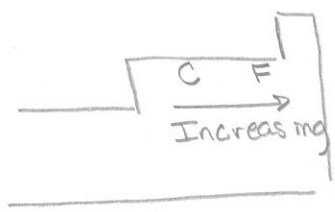


Ionization potential -  
The amount of energy required to remove an electron from the atom

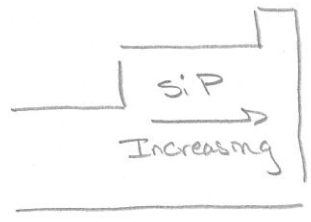
a. Na vs. Mg  
easier  
Lower IP



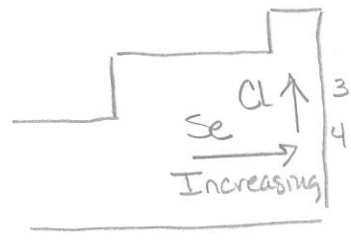
b. C vs. F  
easier



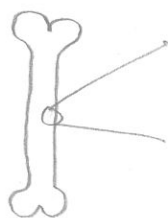
c. Si vs. P  
easier



d. Cl vs. Se  
easier



102) Strontium-90 is a radioactive isotope formed in nuclear reactors. When an unusually high level of Strontium is released into the air, such as occurred during the Chernobyl nuclear disaster in 1986, the Strontium can be incorporated into the bones of exposed individuals. High levels of Strontium can cause bone cancer and leukemia. Why does Sr-90 cause this particular health problem?

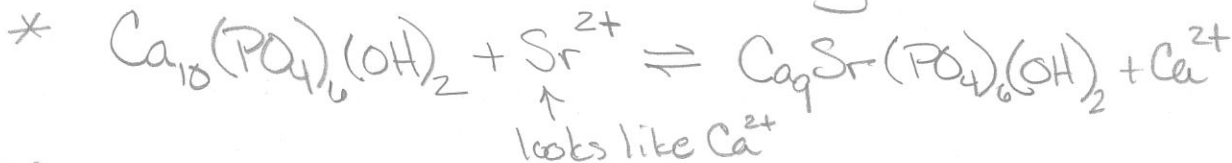


Bone is composed of a mineral called hydroxyapatite  $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$

Free calcium in the body  $\text{Ca}^{2+}$  is used to make new bone structure along with phosphate  $\text{PO}_4^{3-}$  and hydroxide  $\text{OH}^-$ .



However, when provided with Sr, the body will also incorporate Sr into the hydroxyapatite mineral because it is chemically similar to Ca.



The Sr-90 stays in the bone, releasing its radiation, damaging bone cells and newly forming blood cells.