

## Announcements – Lecture III – Wednesday, May 22<sup>nd</sup>

a) Add/Drop, FRIDAY, MAY 24<sup>th</sup>

b) FIRST LAB, TUESDAY, MAY 27<sup>th</sup>



**Quiz 1**

Last Name: \_\_\_\_\_

Class No \_\_\_\_\_

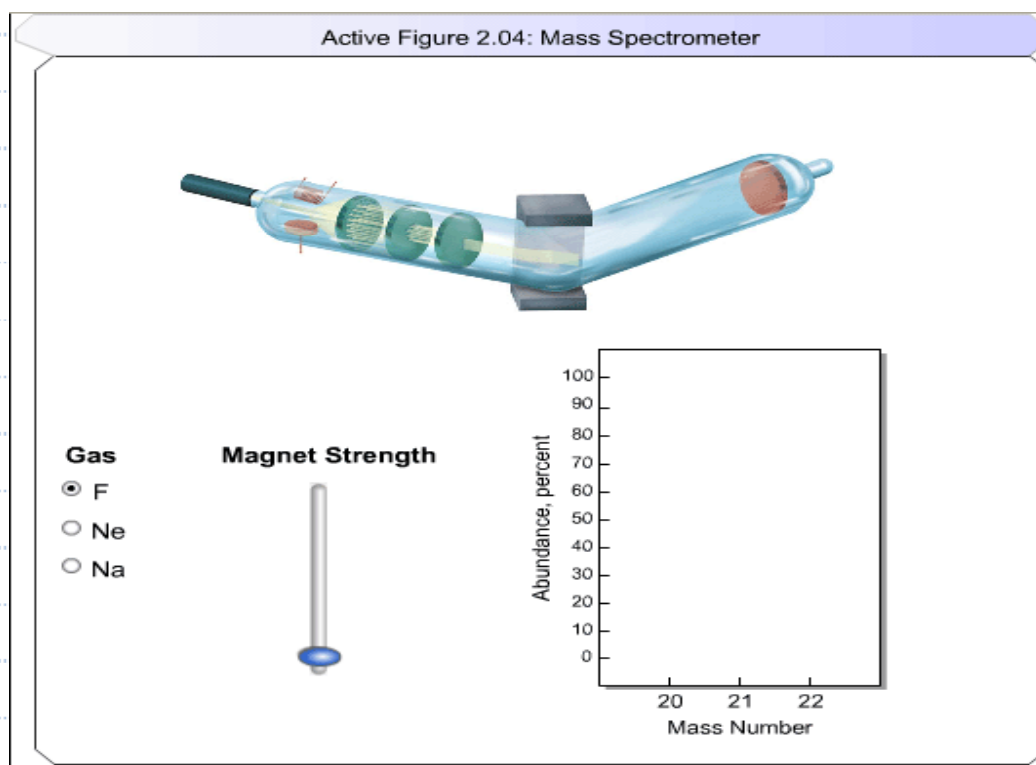
- a) When **57.188** is added to **46.82**, the result should be reported with digit(s) after the decimal point. 2
- b) When **1234.56** is subtracted from **123**, the result should be reported with digit(s) after the decimal point. 0
- c) When **57.188** is multiplied by **46.82**, the answer should be reported to significant digit(s). 4
- d) When **40.389** is divided by **58.479**, the answer should be reported to significant digit(s). 5

## 2.1 The Structure of the Atom

### c) Isotopes

Some number of protons, different number of neutrons ... different mass number

	PROTONS	NEUTRONS	ELECTRONS
$^{12}\text{C}$	6	6	6
$^{14}\text{C}$	6	8	6



Go to class web site to play with this simulation.



## 2.1 The Structure of the Atom

### c) Atomic Weight

The weighted average of all naturally occurring isotopes of an element.

#### 2.1c Atomic Weight – Example\_1

Chlorine has two naturally occurring isotopes:

$^{35}\text{Cl}$ , 75.77% Abundant, Exact Mass 34.96885 amu

$^{37}\text{Cl}$ , 24.23% Abundant, Exact Mass 36.96590 amu

What is the Atomic Weight of Chlorine?

$$0.7577(34.96885) + 0.2423(36.96590) = 35.452734 \text{ amu}$$



## 2.1 The Structure of the Atom

### c) Atomic Weight

The 4<sup>th</sup> decimal place in the answer is  
a) 5    b) 6    c) 7    d) 8 ✓    e) 9

### 2.1c Atomic Weight – Example\_2

Neon has 3 naturally occurring isotopes:

$^{20}\text{Ne}$ ,	90.92% Abundant,	Exact Mass 19.9989 amu
$^{21}\text{Ne}$ ,	0.26% Abundant,	Exact Mass 20.9975 amu
$^{22}\text{Ne}$ ,	8.82% Abundant,	Exact Mass 21.9979 amu

What is the Atomic Weight of Neon?

$$0.9092(19.9989) + 0.0026(20.9975) + 0.0882(21.9979) = \underline{20.177806} \text{ amu}$$



## 2.2 Elements and the Periodic Table

### The Periodic Table

Groups	1A																	7A	8A					
Main Group Elements	H	2A																	H	He				
Transition Group Elements	Li	Be																	B	C	N	O	F	Ne
Periods	Na	Mg	3B	4B	5B	6B	7B	8B	1B	2B	Al	Si	P	S	Cl	Ar								
Lanthanides and Actinides	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
Metals	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
Nonmetals	Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
Metalloids	Fr	Ra	Ac**	Rf	Ha																			
Alkali Metals			Lanthanide*	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu							
Alkaline Earth Metals			Actinide**	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr							
Halogens																								
Noble Gases																								

Go to class web site to interact with this simulation.

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Lanthanides and Actinides	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
Metals	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
Nonmetals	Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
Metalloids	Fr	Ra	Ac**	Rf	Ha															
Alkali Metals			Lanthanide*																	
Alkaline Earth Metals			Actinide**																	
Halogens			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
Noble Gases			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

● METALS ... like to lose electrons  
● NONMETALS ... like to gain electrons  
● METALLOIDS

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Metalloids	Fr	Ra	Ac**	Rf	Ha													
Alkali Metals																		
Alkaline Earth Metals																		
Halogens																		
Noble Gases																		
			Lanthanide*	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
			Actinide**	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	





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### The Periodic Table

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Metals	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
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Metalloids	Fr	Ra	Ac**	Rf	Ha													
Alkali Metals																		
Alkaline Earth Metals																		
Halogens																		
Noble Gases																		
7 Diatomics																		

Lanthanide*	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Actinide**	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

*Handwritten notes:*  
 Ha (under Hydrogen)  
 N = element 7!  
 N<sub>2</sub>, O<sub>2</sub>, F<sub>2</sub>  
 Cl<sub>2</sub>  
 Br<sub>2</sub>  
 I<sub>2</sub>

## 8.1 An Introduction to Covalent Bonding

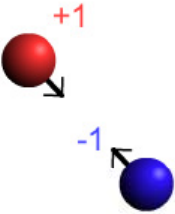
### Coulomb's Law

Coulomb's Law

stationary ion  
+1

mobile ion  
-1

See class web site to interact with this simulation.



Force of Attraction =  $3.7 \times 10^{-9}$  N  
Distance = 2.50 Å

FA : Force of Attraction

Magnitude of FA depends on:  
a) Magnitude of the charges.  
c) Distance between the charges.