

Announcements – Lecture III – Wednesday, May 20th

1. Class Web Site: www.chem.umass.edu/genchem
2. Add/Drop: Friday, May 22th
3. No Class: Monday, May 25th , Memorial Day
4. First Lab: Tuesday, May 26th , ISB 155



Quiz 1

Last Name: _____

Class No _____

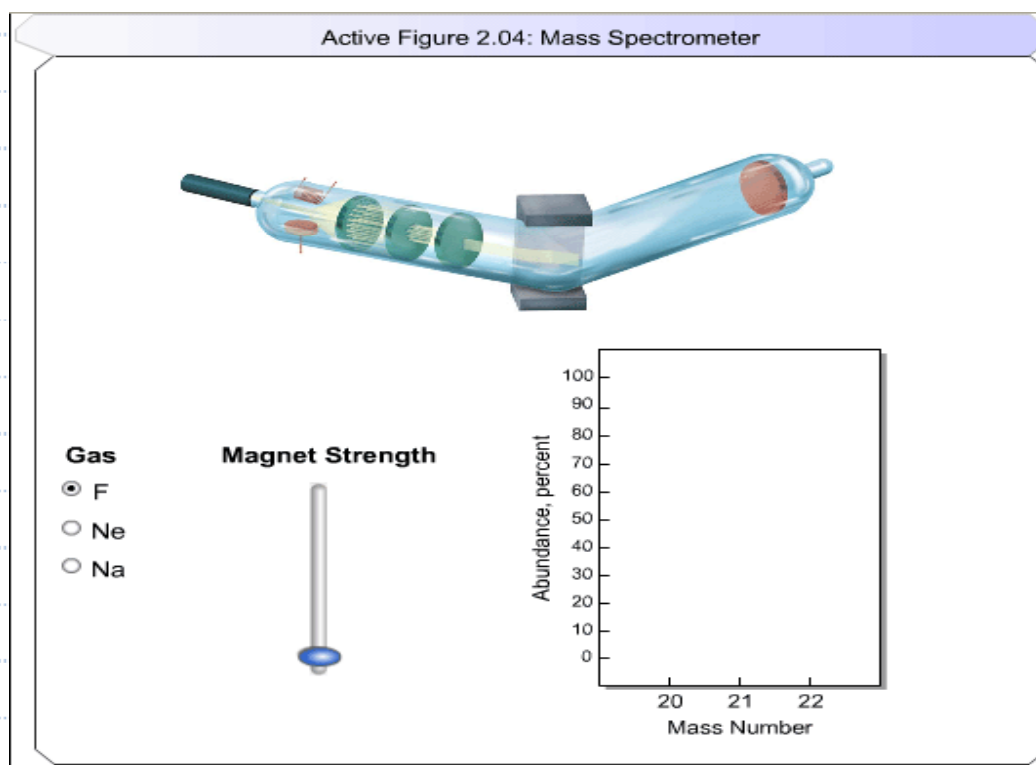
- a) When **57.188** is added to **46.82**, the result should be reported with digit(s) after the decimal point. 2
- b) When **1234.56** is subtracted from **123**, the result should be reported with digit(s) after the decimal point. 0
- c) When **57.188** is multiplied by **46.82**, the answer should 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}C	6	6	6
^{14}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}Cl , 75.77% Abundant, Exact Mass 34.96885 amu

^{37}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 4th 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}Ne ,	90.92% Abundant,	Exact Mass 19.9989 amu
^{21}Ne ,	0.26% Abundant,	Exact Mass 20.9975 amu
^{22}Ne ,	8.82% Abundant,	Exact Mass 21.9979 amu

What is the Atomic Weight of Neon?

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



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

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				Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

TRANSITION METALS

Main Group: 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A

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Alkali Metals																		
Alkaline Earth Metals																		
Halogens																		
Noble Gases																		
7 Diatomics																		

Ha

N = element 7!

N₂, O₂, F₂
Cl₂
Br₂
I₂