

Name: ANSWERS

## Isotopes and Calculating Average Atomic Mass

A) Use a Periodic Table and your knowledge of calculating  $p^+$ ,  $e^-$ , and  $n^0$  to complete the following chart dealing with isotopes. Fill in all the empty spaces.

#	Symbol	Atomic #	# $p^+$	# $n^0$	Atomic Mass	#	Symbol	Atomic #	# $p^+$	# $n^0$	Atomic Mass
1.	$^1\text{H}$	1	1	0	1	12.	$^{242}\text{U}$	92	92	150	242
2.	$^2\text{H}$	1	1	1	2	13.	$^{60}\text{Co}$	27	27	33	60
3.	$^3\text{H}$	1	1	2	3	14.	$^8\text{Be}$	4	4	4	8
4.	$^{30}\text{P}$	15	15	15	30	15.	$^{16}\text{O}$	8	8	8	16
5.	$^{32}\text{P}$	15	15	17	32	16.	$^{35}\text{Cl}$	17	17	18	35
6.	$^{34}\text{P}$	15	15	19	34	17.	$^{36}\text{Cl}$	17	17	19	36
7.	$^{40}\text{Ca}$	20	20	20	40	18.	$^{107}\text{Ag}$	47	47	60	107
8.	$^{43}\text{Ca}$	20	20	23	43	19.	$^{110}\text{Ag}$	47	47	63	110
9.	$^{235}\text{U}$	92	92	143	235	20.	$^{198}\text{Hg}$	80	80	118	198
10.	$^{238}\text{U}$	92	92	146	238	21.	$^{201}\text{Hg}$	80	80	121	201
11.	$^{241}\text{U}$	92	92	149	241	22.	$^{204}\text{Hg}$	80	80	124	204

B) Calculate the average atomic mass of the following elements.

- i. A sample of magnesium contains 78.99%  $^{24}\text{Mg}$  (magnesium-24), 10.0%  $^{25}\text{Mg}$  (magnesium-25) and 11.01%  $^{26}\text{Mg}$  (magnesium-26).

$$\begin{aligned}
 \text{avg. atomic mass} &= (m_{\text{Mg-24}})(\% \text{ Mg-24}) + (m_{\text{Mg-25}})(\% \text{ Mg-25}) + (m_{\text{Mg-26}})(\% \text{ Mg-26}) \\
 &= (24\text{g})(0.7899) + (25\text{g})(0.10) + (26\text{g})(0.1101) \\
 &= 24.32\text{g}
 \end{aligned}$$

- ii. Sulfur is composed of 94.93%  $^{32}\text{S}$ , 0.76%  $^{33}\text{S}$ , 4.29%  $^{34}\text{S}$  and 0.02%  $^{36}\text{S}$ .

$$\begin{aligned}
 \text{avg. atomic mass} &= (m_{\text{S-32}})(\% \text{ S-32}) + (m_{\text{S-33}})(\% \text{ S-33}) + (m_{\text{S-34}})(\% \text{ S-34}) + (m_{\text{S-36}})(\% \text{ S-36}) \\
 &= (32\text{g})(0.9493) + (33\text{g})(0.0076) + (34\text{g})(0.0429) + (36\text{g})(0.0002) \\
 &= 32.09\text{g}
 \end{aligned}$$