

## Isotope and Ions Practice Worksheet

Name: Answers

### Part I: Isotopes

1. Define an isotope.

same # of  $p^+$ , different # of  $n^0$

2. What would happen if the number of protons were to change in an atom?

changes what element it is

3. Another way to write isotopes is to write the name of the element then add the mass number after a dash, for example,  $^{14}_6\text{C}$  is carbon-14. Why isn't the atomic number needed for this notation?

Carbon always has 6  $p^+$  (the atomic # is constant)

4. Here are three isotopes of an element:  $^{12}_6\text{C}$        $^{13}_6\text{C}$        $^{14}_6\text{C}$

a. The element is: Carbon

b. The number 6 refers to the atomic # / # of  $p^+$

c. The numbers 12, 13, and 14 refer to the mass numbers

d. How many protons and neutrons are in the first isotope? 6  $p^+$ , 6  $n^0$

e. How many protons and neutrons are in the second isotope? 6  $p^+$ , 7  $n^0$

f. How many protons and neutrons are in the third isotope? 6  $p^+$ , 8  $n^0$

Complete the following chart:

Isotope name	atomic #	mass #	# of protons	# of neutrons	# of electrons
92 uranium-235	92	235	92	143	92
92 uranium-238	92	238	92	146	92
5 boron-10	5	10	5	5	5
5 boron-11	5	11	5	6	5

### Part II: Ions

Determine the charges on the following using the diagram above as a guide:

1. An atom having lost two electrons

2+

2. An atom having lost six electrons

6+

3. An atom having gained one electron

1-

4. An atom having gained three electrons

3-

5. An atom having lost five electrons

5+

6. An atom having gained two electrons

2-

7. An atom having lost one electron

1+

8. An atom having gained four electrons

4-

## Ions Continued

Complete the following:

1. For each of the positive ions listed in column 1, use the periodic table to find in column 2 the total number of electrons that ion contains. The same answer may be used more than once.

<u>B</u> 1. $\text{Al}^{+3}$	A. 2
<u>D</u> 2. $\text{Fe}^{+3}$	B. 10
<u>B</u> 3. $\text{Mg}^{+2}$	C. 21
<u>H</u> 4. $\text{Sn}^{+2}$	D. 23
<u>F</u> 5. $\text{Co}^{+2}$	E. 24
<u>E</u> 6. $\text{Co}^{+3}$	F. 25
<u>A</u> 7. $\text{Li}^{+1}$	G. 36
<u>C</u> 8. $\text{Cr}^{+3}$	H. 48
<u>G</u> 9. $\text{Rb}^{+1}$	I. 76
<u>I</u> 10. $\text{Pt}^{+2}$	J. 81

Element/Ion	Atomic Number	Number of Protons	Number of Neutrons	Number of Electrons	Mass Number
${}^1_1\text{H}$	1	1	0	1	1
${}^1_1\text{H}^+$	1	1	0	0	1
${}^{35}_{17}\text{Cl}^-$	17	17	18	18	35
${}^{24}_{12}\text{Mg}^{2+}$	12	12	12	10	24
${}^{108}_{47}\text{Ag}^+$	47	47	61	46	108
${}^{32}_{16}\text{S}^{2-}$	16	16	16	18	32
${}^{66}_{30}\text{Zn}^{2+}$	30	30	36	28	66
${}^{190}_{76}\text{Os}$	76	76	114	76	190

Answer the following questions:

1. Define an ion. *Atoms that have lost or gained  $e^-$ .*

2. a. How can you tell if an atom has a negative charge? What type of ion is this?

*Gained  $e^-$ , more  $e^-$  than  $p^+$ . Anion*

- b. How can you tell if an atom has a positive charge? What type of ion is this?

*Lost  $e^-$ , more  $p^+$  than  $e^-$ . Cation.*