

## CHAPTER 2 BLM ANSWER KEY

### BLM 2-1: Pre-Chapter Quiz

- F; positively charged
- F; 13 protons and 14 neutrons
- T
- T
- F; nebulous or fuzzy outer boundary
- F; atomic number
- F; vertical columns
- F; potassium
- F; neutrons and protons
- F;  $A$  is mass number,  $Z$  is atomic number
- T
- F; there is a limit
- F; helium
- F; differing numbers of neutrons
- T
- F; 8

### BLM 2-2: Subatomic Particles Worksheet

Answers are highlighted.

Element Name	Chemical Notation	Number of Protons	Number of Electrons	Number of Neutrons
Aluminum	$^{27}_{13}\text{Al}$	13	13	14
Beryllium	$^9_4\text{Be}$	4	4	5
Boron	$^{11}_5\text{B}$	5	5	6
Argon	$^{40}_{18}\text{Ar}$	18	18	22
Carbon	$^{12}_6\text{C}$	6	6	6
Chlorine	$^{35}_{17}\text{Cl}$	17	17	18
Potassium	$^{39}_{19}\text{K}$	19	19	20
Helium	$^4_2\text{He}$	2	2	2
Lithium	$^7_3\text{Li}$	3	3	4
Hydrogen	$^1_1\text{H}$	1	1	0
Magnesium	$^{24}_{12}\text{Mg}$	12	12	12
Neon	$^{20}_{10}\text{Ne}$	10	10	10

Element Name	Chemical Notation	Number of Protons	Number of Electrons	Number of Neutrons
Nitrogen	$^{14}_7\text{N}$	7	7	7
Oxygen	$^{16}_8\text{O}$	8	8	8
Phosphorus	$^{31}_{15}\text{P}$	15	15	16
Nickel	$^{59}_{28}\text{Ni}$	28	28	31
Silicon	$^{28}_{14}\text{Si}$	14	14	14
Sulfur	$^{32}_{16}\text{S}$	16	16	16
Sodium	$^{23}_{11}\text{Na}$	11	11	12

### BLM 2-3: Properties of the Main-group Elements

The following represent sample answers only.

Chemical Group	Common Physical Properties	Common Chemical Properties
alkali metals	<ul style="list-style-type: none"> <li>silvery, grey</li> <li>very soft; can be cut with a knife</li> <li>good conductors of electricity</li> <li>shiny when freshly cut, but react (oxidize) quickly in air</li> <li>have relatively low melting points</li> </ul>	<ul style="list-style-type: none"> <li>react with water to produce hydrogen gas and a basic solution</li> <li>very reactive so not found in their pure form in nature</li> <li>reactive with acids</li> </ul>
alkaline earth metals	<ul style="list-style-type: none"> <li>good conductors of electricity</li> <li>shiny but react (oxidize) quickly in air</li> <li>silvery, gray</li> <li>harder than alkali metals</li> </ul>	<ul style="list-style-type: none"> <li>react with some acids</li> <li>react with oxygen to form compounds called oxides which react with water to form basic solutions</li> </ul>
halogens	<ul style="list-style-type: none"> <li>fluorine and chlorine are gases at room temperature</li> <li>bromine is a liquid at room temperature</li> <li>iodine and astatine are solids at room temperature</li> <li>lower melting points than alkali metals</li> </ul>	<ul style="list-style-type: none"> <li>very reactive especially with alkali metals and alkaline earth metals to form compounds called "salts"</li> <li>not found in nature in pure form because so reactive</li> </ul>
noble gases	<ul style="list-style-type: none"> <li>all are gaseous non-metals</li> <li>odourless</li> <li>colourless</li> </ul>	<ul style="list-style-type: none"> <li>very non-reactive because chemically stable</li> </ul>

## CHAPTER 2 BLM ANSWER KEY

### BLM 2-4: Chapter 2 Test

#### Part 1: Multiple Choice

- (d) Dalton
- (c) orbitron
- (a) atomic number
- (c) numbers of neutrons
- (e) atomic numbers
- (c) F, Cl, Br, I
- (d) electron arrangements
- (c) 1+ and 0

#### Part 2: Short Answer & Calculations

9.

Element	Atomic Mass	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons
vanadium	51	23	23	23	28
bromine	80	35	35	35	45
palladium	106	46	46	46	60
cesium	133	55	55	55	78
potassium	39	19	19	19	20
zinc	65	30	30	30	35

10. (a) alkali metals: soft, grey metals, shiny, and very reactive with water  
(b) alkaline earth metals: grey metals, shiny, and quite reactive with water  
(c) halogens: fluorine and chlorine are gases, bromine is a liquid, iodine and astatine are solids, very reactive especially with the alkali metals

11. (a) sodium: single dot;  
(b) sulfur: 6 dots;  
(c) calcium: 2 dots;  
(d) argon: 8 dots;  
(e) phosphorus: 5 dots; silicon: 4 dots; boron: 3 dots; rubidium: 1 dot; thallium: three dots; bromine: 7 dots
12. Atomic radius increases down a group and decreases across a period. First ionization energy follows an opposite trend, decreasing down a group and increasing across a period.
13. Isotopes of an element must have the same atomic number.
14. Disagree; elements with three or fewer valence electrons are metals.
15. (a) group 1 elements have 1 electron in valence level; group 2 elements have 2 electrons  
(b) group 13 through 18 elements have same number of valence electrons as the last digit in the group number
16. (a) A has smallest atomic radius; B has largest  
(b) B has lowest electron affinity; A has highest