

Periodic Table and Atomic Structure

1. Consider this periodic table.

a. What is the group number (include both the “Old” and “New” numbers) and group name indicated by the shading?

17 (new), 7A or VII A (old)

b. What elements make up this group?

F, Cl, Br, I, At, Ts (halogens)

c. What is the number of outer electrons for each element of this group?

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2. Using the periodic table as a guide, give the name and symbol of the element that has the given number of protons in the nucleus.

# Protons	6	2	19	47
Element name	Carbon	helium	potassium	silver
Element symbol	C	He	K	Ag

3. Give the symbol showing the atomic number and the mass number for the element that has
Example: 6 protons and 7 neutrons: $^{13}_6\text{C}$

a. 9 protons and 10 neutrons (an isotope used in nuclear medicine)

$^{19}_9\text{F}$

b. 26 protons and 30 neutrons (the most stable isotope of this element)

$^{56}_{26}\text{Fe}$

c. 86 protons and 136 neutrons (the radioactive gas found in homes)

$^{222}_{86}\text{Rn}$

4. Complete the table below. Carbon is included as an example.

Element	carbon	calcium	nitrogen	chlorine	argon
Atomic Number	6	20	7	7	18
# Valence electrons	4	2	5	7	8
Electron dot structure	$\cdot\overset{\cdot}{\underset{\cdot}{\text{C}}}\cdot$	$\text{Ca}::$	$\cdot\overset{\cdot}{\underset{\cdot}{\text{N}}}\cdot$	$:\overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}\cdot$	$:\overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Ar}}}::$

5. Fill-in the electronic configuration for the following elements.

Element: Sulfur (16 electrons total, $1s^2 2s^2 2p^6 3s^2 3p^4$)

3d _____

3p $\uparrow\downarrow$ \uparrow \uparrow

3s $\uparrow\downarrow$

2p $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$

2s $\uparrow\downarrow$

1s $\uparrow\downarrow$

Element: Cobalt (27 electrons total, $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$)

4d _____

4p _____

4s $\uparrow\downarrow$

3d $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow \uparrow \uparrow

3p $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$

3s $\uparrow\downarrow$

2p $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$

2s $\uparrow\downarrow$

1s $\uparrow\downarrow$