

## Review - Section 1B

1) For each of these elements, identify the number of protons or electrons needed for an electrically neutral atom.

- a. carbon: 6 protons **6** electrons  
 b. aluminum: **13** protons 13 electrons

- c. lead: 82 protons **82** electrons  
 d. chlorine: **17** protons 17 electrons

2) Calculate the charge of each atoms and decide whether each of these atoms is electrically neutral, a positive ion or a negative ion.

- a. sulfur: 16 protons 18 electrons **-2, negative ion**  
 b. iron: 26 protons 24 electrons **+2, positive ion**  
 c. silver: 47 protons 47 electrons **0, neutral**  
 d. iodine: 53 protons 54 electrons **-1, negative ion**

3) Complete the table located below for each electrically neutral atom.

| Element Symbol | Number of Protons | Number of Neutrons | Number of electrons |
|----------------|-------------------|--------------------|---------------------|
| <b>C</b>       | 6                 | 6                  | 6                   |
| Ca             | <b>20</b>         | 21                 | 20                  |
| <b>Pt</b>      | <b>78</b>         | 117                | 78                  |

4) A student is asked to explain the formation of a lead (II) ion ( $\text{Pb}^{+2}$ ) from an electrically neutral lead atom (Pb). The student says that a lead atom must have gained two protons to make the ion. How would you correct this student's explanation?

**If the atom gained two protons, it would be a different element. The statement could be corrected by saying that the "lead atom must have lost two electrons to make the ion". This would give 2 more positive protons than negative electrons, making it a +2 charge.**

5) Write the symbol and show the electrical charge (if any) on the following atoms or ions:

- a. hydrogen with 1 proton and 1 electron **H**  
 b. sodium with 11 protons and 10 electrons **Na<sup>+1</sup>**  
 c. chlorine with 17 protons and 18 electrons **Cl<sup>-1</sup>**  
 d. aluminum with 13 protons and 10 electrons **Al<sup>+3</sup>**

6. Complete the table below:

| Atom/Ion                     | Number of protons | Number of neutrons | Number of electrons |
|------------------------------|-------------------|--------------------|---------------------|
| ${}_{33}^{75}\text{As}^{-3}$ | <b>33</b>         | <b>42</b>          | <b>36</b>           |
| ${}_{33}^{75}\text{As}$      | <b>33</b>         | <b>42</b>          | <b>33</b>           |
|                              |                   |                    |                     |
| ${}_{33}^{75}\text{As}^{+5}$ | <b>33</b>         | <b>42</b>          | <b>28</b>           |
| <b>Cu<sup>-2</sup></b>       | 27                | 32                 | 29                  |
| <b>Cu</b>                    | 27                | 32                 | 27                  |

7) Make a table showing the location, charge and mass of each of the three subatomic particles.

|          | Proton  | Neutron | Electron             |
|----------|---------|---------|----------------------|
| Location | Nucleus | Nucleus | Orbiting the nucleus |
| Charge   | +1      | 0       | -1                   |
| Mass     | 1       | 1       | 0                    |

8) Give another term for a row and 2 other terms for a column from the periodic table.

Row: **Period**

Column: **Group or Family**

9) Give the names and symbols of two elements in the alkali metal family (Group 1).

**Lithium (Li), Sodium (Na)**

10) Where is the noble gas (Group 18) family located on the periodic table? Where is the halogen family located (Group 17)? **Noble gases are the last group to the right, halogens are the second to last group to the right**

11) The melting points of sulfur (S) and tellurium (Te) are 115 °C and 450 °C, respectively. Estimate the melting point of selenium (Se). **Selenium should be somewhere between the 2, say around 300 °C.**

12) Predict the charge on the following elements when they form a charge.

a. sodium **+1**

b. calcium **+2**

c. chlorine **-1**

d. fluorine **-1**

13) Write the name and formula for the ionic compound that can be formed from these cations and anions:

| Elements/Groups                     | Chemical Formula                                  | Chemical Name             |
|-------------------------------------|---|---------------------------|
| K and I                             | <b>KI</b>   | <b>Potassium iodide</b>   |
| Ca and S                            | <b>CaS</b>  | <b>Calcium sulfide</b>    |
| Fe <sup>+3</sup> and Br             | <b>FeBr<sub>3</sub></b>                           | <b>Iron (III) bromide</b> |
| Ba and OH                           | <b>Ba(OH)<sub>2</sub></b>                         | <b>Barium hydroxide</b>   |
| NH <sub>4</sub> and PO <sub>4</sub> | <b>(NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub></b> | <b>Ammonium phosphate</b> |
| Al and O                            | <b>Al<sub>2</sub>O<sub>3</sub></b>                | <b>Aluminum oxide</b>     |

14) Which of these reactions is more likely to occur? Why? (Refer to your metal activity series table.)

a. Calcium metal with barium chloride solution.

b. **Barium metal with calcium chloride solution.** **More likely to occur. Ba is higher on the list than Ca, so Ba would rather be in a compound than Ca, so Ba will push out the Ca and take its place.**

15) Why would it be a poor idea to stir a solution of lead (II) nitrate with an iron spoon? (Refer to your metal activity series table.)

**The iron is higher in reactivity than the lead, so the iron will react with the lead nitrate, and push the lead out of the compound and become part of the compound. The spoon would start to become more lead.**

16) Circle the correct answers:

a. Atomic radius goes ( up **down** neither ) as you move across the periodic table from left to right and ( **up** down neither ) as you move down the table.

b. Ionization energy goes ( **up** down neither ) as you move across the periodic table from left to right and ( up **down** neither ) as you move down the table.

c. Electronegativity goes ( **up** down neither ) as you move across the periodic table from left to right and ( up **down** neither ) as you move down the table.

17) Find the following elements on the periodic table: Rubidium, Iodine, Silver, Chlorine, Sodium. Using those 5 elements, fill in the table below:

|                      | Highest  | Lowest   |
|----------------------|----------|----------|
| Atomic Radius (Size) | Rubidium | Chlorine |
| Ionization Energy    | Chlorine | Rubidium |
| Electronegativity    | Chlorine | Rubidium |