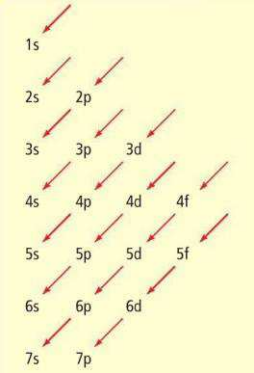
Science with Mr. Powner
Name:
Period:
Date:

Ionic Bonding Quiz

Instructions:
This is an open book quiz. You may use the resources from Mr. Powner's website as well (periodic table tools and polyatomic reference sheet)

1. Use the electron sublevel chart to write out the electron configuration of a ground-state atom of silicon.



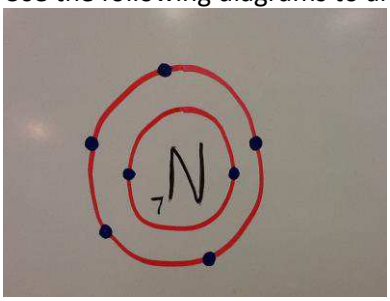
2. How many *p-orbital* electrons does a ground state atom of phosphorus have? Hint: use the website's periodic trends tool, focusing on the Electron Configuration chart.

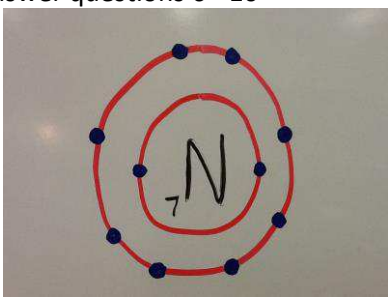
3. Metals tend to _____ electrons to form _____.
   Hint: remember my mental trick, "Anna is very negative about the positivity of cats."
   a. gain | cations (+ charge)
   b. lose | cations (+ charge)
   c. gain | anions (- charge)
   d. lose | anions (- charge)

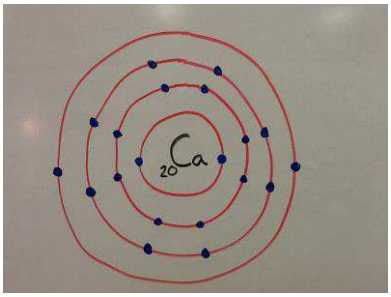
4. Nonmetals tend to _____ electrons to form _____.
   a. gain | cations (+ charge)
   b. lose | cations (+ charge)
   c. gain | anions (- charge)
   d. lose | anions (- charge)

5. Ask yourself, "Would it be less energy for a phosphorus atom to gain 3 electrons or lose 5 to achieve a stable valence shell configuration?" Now predict the charge on a phosphorus ion.

Use the following diagrams to answer questions 6 - 10







6. Wobble theory suggests that most atoms are stable when the outermost shell of electrons contains eight electrons (octet rule). Otherwise, the orbiting of electrons at near the speed of light causes the atom to wobble (unstable). What would a ground state calcium atom do to achieve a stable valence shell?

7. How many valence electrons does a ground-state (zero electrostatic charge) nitrogen atom have?

8. How many valence electrons does a nitrogen ion atom have?

9. What would be the chemical formula for the crystalline salt created by the ionic bonding of calcium and nitrogen?

10. What is the name for the ionic compound formed in question 9?

11. Write the chemical formula for the ionic compound formed by adding ammonium to a chlorine ion

12. Name the ionic compound with the chemical formula $CaCO_3$

13. Name for the ionic compound with the chemical formula $Mg_3(PO^4)_2$

14. Write the chemical formula for the ionic compound formed by adding a boron ion to a chlorite ion.

15. If you had a small quantity of hydrogen cyanide in one sealed container and an equal amount of sodium cyanide in another sealed container, which one would more likely be a solid? ***Explain your answer.***