Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_

**Unit 3 TEST Review: The Periodic Table as a Model**

1. Elements in the same family or group have same number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_electrons.

2. Classify the elements below as: **metal , nonmetal , metalloid**

 a. sulfur \_\_\_\_\_\_\_\_\_\_\_ d. magnesium \_\_\_\_\_\_\_\_\_\_\_\_

 b. iron \_\_\_\_\_\_\_\_\_\_\_ e. silicon \_\_\_\_\_\_\_\_\_\_\_\_

 c. hydrogen \_\_\_\_\_\_\_\_\_\_\_ f. chromium \_\_\_\_\_\_\_\_\_\_\_\_

3. Write the symbol for the mystery element based on the clue.

 \_\_\_\_\_ a. non-reactive, stable element having the smallest radius in its group

 \_\_\_\_\_ b. halogen having the highest ionization energy

 \_\_\_\_\_ c. period 4 element, having 6 valence electrons

 \_\_\_\_\_ d. transition metal having the smallest atomic mass in Group 8

 \_\_\_\_\_ e. period 3 metal with one valence electron

 \_\_\_\_\_ f. Group 14 element with the lowest atomic number

 \_\_\_\_\_ g. alkaline earth metal having the lowest ionization energy

 \_\_\_\_\_ h. has 2 more protons than carbon

 \_\_\_\_\_ i. period 4 element with 5 valence electrons

 \_\_\_\_\_ j. very reactive group 1 element, found in period 6

 \_\_\_\_\_ k. the most electronegative element on the periodic table

4. A chemist needs calcium to perform an experiment in the lab and discovers that she does not have

 any calcium. List the two elements that she could use for this experiment to best replace calcium.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explain your choices: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. For each family (or group) of elements, describe the area of the periodic table in which it is located.

 a. alkali metals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. halogens \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 c. transition metals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 d. alkaline earth metals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 e. noble gases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 f. inner transition metals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 g. representative elements \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. The periodic table was developed by Mendeleev in the 1800s. He arranged the elements that were

 known at the time by increasing atomic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and placed them into groups based on

 similar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. What was Mendeleev able to do using the periodic table that he designed?

8. What does each period number on the periodic table represent about the atoms in that period?

9. What is the amount of energy required to remove an electron from an atom?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. What is an atom's ability to attract electrons when involved in a chemical bond?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. How many valence electrons do each of the following groups or families of elements have?

 a. halogens \_\_\_\_

 b. noble gases \_\_\_\_

 c. Group 2 \_\_\_\_

 d. Group 13 \_\_\_\_

 e. alkali metals \_\_\_\_

 f. group 16 (6A) \_\_\_\_

 g. Group 14 (4A) \_\_\_\_

 h Group 15 (5A) \_\_\_\_



12. For the elements listed above, which element has the largest atomic radius? \_\_\_\_

 Which element has the smallest atomic radius? \_\_\_\_

 These atoms change size from left to right. Why do their sizes follow this trend from left to right?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



13. Place the highlighted elements in the periodic table in order from *largest to smallest* by

 atomic radius.

 \_\_\_\_ > \_\_\_\_ > \_\_\_\_ > \_\_\_\_

14. Circle the largest of the 2 particles.

 a. Ca, or Ca+2

 b. Ba, or Ba+2

 c. F, or F –1,

 d. Br, or Br –1



15. Which element above has the *lowest* ionization energy? \_\_\_\_\_\_\_\_

 Which element has the *highest* ionization energy? \_\_\_\_\_\_\_

**Figure B**

**Figure A**



 ***Most Reactive: Either loses or gains electrons the easiest***

16. Organize the elements in **Figure A** from *least to most* reactive.

 \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_

 Organize the elements in **Figure B** from *least to most* reactive.

 \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_

17. Fill in the missing information for the element fluorine.

 a. F has the \_\_\_\_\_\_\_\_\_\_\_ atomic radius in its group.

 b. F has the \_\_\_\_\_\_\_\_\_\_\_ ionization energy in its group.

 c. F has the \_\_\_\_\_\_\_\_\_\_\_ electronegativity in its group.

 d. F is the \_\_\_\_\_\_\_\_\_\_ reactive element in its group.

**For questions 18 – 20**, use this graph showing the first ionization energies of elements 1-19.



Graph showing the

1st ionization energies

of elements 1-19

18. What does the graph show about the elements He, Ne and Ar?

 They have the \_\_\_\_\_\_\_\_\_\_\_\_\_ ionization energies because their outermost energy level has

 \_\_\_\_\_\_\_\_\_\_ electron(s) and is held closer to the atom’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by extra \_\_\_\_\_\_\_\_\_\_\_.

 What does this indicate about their stability? relatively stable or fairly reactive

19. What does the graph show about the elements Li, Na, and K?

 They have the \_\_\_\_\_\_\_\_\_\_\_\_\_ ionization energies because their outermost energy level has

 \_\_\_\_\_\_\_\_\_\_ electron(s) and is located \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the atom’s nucleus.

 What does this indicate about their stability? relatively stable or fairly reactive

20. The direction of the line graph from Li to Ne and from Na to Ar generally goes up as atomic number

 increases. But it drops suddenly from Ne to Na and from Ar to K.

 Why does this sudden drop occur from Ne to Na?

 A. atomic radius decreases

 B. atomic number increases

 C. valence electron now in energy level further from nucleus

 D. valence electron now attracted more to the nucleus