

Name _____ "Atoms Family Values"

A) Fe B) Kr C) Ca D) K E) Br

1-8. Above are the symbols for 5 elements. Assume that they are all in the ground state. Choose the letter (A, B, C, D, or E) that corresponds to the element that best fits each description.

- _____ 1. The most likely of these elements to react with other elements by losing electrons
- _____ 2. A gas at room temperature
- _____ 3. A halogen
- _____ 4. Forms an ion that has the same number of electrons as an Rb^+ ion.
- _____ 5. It requires the greatest amount of energy to remove an electron from this element.
- _____ 6. The distance from the nucleus to the valence electron is smallest in this element.
- _____ 7. When an isotope of this element has 22 neutrons, it has a mass number of 41.
- _____ 8. This element often reacts by losing electrons from two different principal energy levels.
- _____ 9. An element is found to consist of two isotopes, one with a mass of 300, and the other with a mass of 302. The atomic mass of the element is found to be 300.4 amu. Samples of this element are most likely
- A) 40 % 300, and 60 % 302
B) 80% 300, 20 % 302 C) 20% 300, 80 % 302 D) 50 % 300, 50 % 302
- _____ 10. The charge of a sulfur nucleus is A) +6 B) +4 C) +16 D) -4
- _____ 11. Which element generally forms an ion that has a smaller radius than the neutral atom?
A) F B) Na C) O D) Cl
- _____ 12. Compared with nonmetals, metals generally have
- A) larger atomic radii and larger ionization energies
B) larger atomic radii and smaller ionization energies
C) smaller atomic radii and smaller ionization energies
D) smaller atomic radii and larger ionization energies
- _____ 13. Which of the following does NOT have the same electron configuration as a noble gas? A) S^{2-} B) Ar C) Na^+ D) V^{2+}
- _____ 14. Which element has chemical and physical properties that are most similar to silicon?
A) P B) Ge C) Pb D) Cl
- _____ 15. How many electrons are there in the valence shell of a fluorine atom in the ground state? A) 3 B) 5 C) 7 D) 9

- _____ 16. An atom of carbon-12 and an atom of carbon - 14 differ in
A) mass number B) atomic number C) nuclear charge D) number of electrons
- _____ 17. An excited sodium atom may emit energy when its electron configuration goes from
2-6-1-1-1 to A) 2-5-1-1-2 B) 2-8-1 C) 0-2-8-1 D) 2-1-1-7
- _____ 18. The nucleus of an atom of ^{42}K contains A) 19 protons and 42 neutrons
B) 23 protons and 19 neutrons C) 20 protons and 19 neutrons
D) 19 protons and 23 neutrons
- _____ 19. All of the elements in group 13 of the periodic table have the same
A) atomic radius B) number of valence electrons C) number of occupied shells
D) ionization energy
- _____ 20. The ionization energy, the atomic radius, and the type of ion formed by an atom are
all related. Which of the following choices best illustrates this relationship?
A) large ionization energy, large radius, forms + ions
B) small ionization energy, large radius, forms - ions
C) small ionization energy, small atomic radius, forms - ions
D) Large ionization energy, small radius, forms - ions
- _____ 21. How many electrons will completely fill the third principal energy level?
A) 2 B) 8 C) 18 D) 32
- _____ 22. All atoms and ions that can be called aluminum MUST contain
A) 14 neutrons B) 13 protons C) 10 electrons D) 27 nucleons
- _____ 23. The region that is the most probable location of an electron in an atom is
A) the nucleus B) an ion C) the excited state D) an orbital
- _____ 24. What is the symbol for an alkaline earth metal in period 6 ?
- _____ 25. As the atomic number increases in period 3, the atomic radius generally
A) increases B) decreases C) remains the same
- _____ 26 The element with the highest ionization energy in any given period is
A) a halogen B) a noble gas C) an alkali metal D) a transition metal

I. Draw dot structures for

- A. An oxygen atom. B. A phosphorous atom C. A phosphide (3^-) ion

Extra Credit: How many unpaired electrons are there in

A. A nickel atom

B. An Mn^{3+} ion.

Complete the electron configuration of an atom of Mn. $1s^22s^22p^6$ _____.