

Name: _____

Periodic Chart: Test #1

Multiple Choice

- ___ 1. The modern periodic law states that the properties of the elements are a periodic function of their (1) atomic mass; (2) atomic weight; (3) atomic number; (4) isotope number
- ___ 2. Mendeleev's periodic law stated that the properties of the elements are a periodic function of their (1) atomic mass; (2) atomic weight; (3) atomic number; (4) isotope number; (5) isotope mass number
- ___ 3. Which of the following elements would have the largest atoms (1) Os; (2) Fe; (3) Ni; (4) As.
- ___ 4. The most common oxidation state of elements in group IIA would be (1) 1-; (2) 2+; (3) 1+; (4) 2-.
- ___ 5. Which of the following oxidation states would be expected for bismuth? (1) 2-; (2) 5+; (3) 2+; (4) 5-.
- ___ 6. Elements in the same period generally have (1) similar chemical properties; (2) the same number of electrons in the outer major energy level; (3) similar physical properties; (4) both 1 and 2; (5) both 1 and 3; (1,2) all of the above; (1,3) none of the above.
- ___ 7. Elements in the same group generally show (1) decreasing size with increasing atomic number; (2) increasing size with increasing atomic number; (3) increasing ionization potential with increasing atomic number; (4) decreasing ionization potential with increasing atomic number; (5) both 1 and 3; (1,2) both 2 and 4; (1,3) none of the above.
- ___ 8. Which of the following would be most reactive toward fluorine? (1) K; (2) Ca; (3) Sc; (4) Co.
- ___ 9. Elements in the same period generally show (1) decreasing size with increasing atomic number; (2) increasing size with increasing atomic number; (3) increasing ionization potential with increasing atomic number; (4) decreasing ionization potential with increasing atomic number; (5) both 2 and 4; (1,2) both 1 and 3.
- ___ 10. Which of the following elements would have the lowest ionization potential? (1) Ir; (2) Pt; (3) Pb; (4) Ni; (5) Co.
- ___ 11. Which of the following elements would be the most reactive toward sodium? (1) O; (2) S; (3) Se; (4) Te.
- ___ 12. What type of element would you predict element 117 to be? (1) nonmetal; (2) metal; (3) noble gas; (4) alkali element; (5) metalloid.

- ___ 13. There are many elements in the Star Trek manual that we have not yet discovered. One of these is element 113, Celebium. Which of the following compounds should be possible for Celebium (Cb)? (1) CbO; (2) Cb₂O; (3) Cb₂O₃; (4) both 1 and 2; (5) none of the above; (1,2) both 2 and 3; (1,3) both 1 and 3.
- ___ 14. Which of the following compounds is least likely to exist from the standpoint of oxidation numbers? (1) Na₂S; (2) SeF₆; (3) SF₄; (4) NaO.
- ___ 15. Which of the following elements is an alkali metal? (1) fluorine; (2) oxygen; (3) nitrogen; (4) carbon; (5) boron; (1,2) beryllium; (1,3) lithium; (1,4) iron; (1,5) none of the above.
- ___ 16. Which of the elements in question 15 is a halogen?
- ___ 17. Which of the elements in question 15 is an alkaline earth element?
- ___ 18. A representative element was known to take on a 3- oxidation state. The element also formed a polar covalent bond with aluminum. Which of the following would most likely be this element? (1) N; (2) P; (3) O; (4) F; (5) Ca.
- ___ 19. Which of the following elements is most reactive toward chlorine? (1) Al; (2) Mg; (3) Ca; (4) Sr; (5) Y
- ___ 20. Which of the following elements are most reactive toward sodium? (1) Te; (2) I; (3) Br; (4) Cl; (5) S.
- ___ 21. Which of the following pairs of elements will not form ionic compounds? (1) sulfur and oxygen; (2) sodium and calcium; (3) sodium and sulfur; (4) barium and chlorine.
- ___ 22. Which of the following bonds would be covalent but not polar covalent, that is, a non-polar covalent bond? (1) Al-S; (2) Ge-As; (3) K-F; (4) N-O.
- ___ 23. Electronegativity is a measure of (1) an atom's ability to pull protons to itself; (2) an atom's ability to form ionic bonds; (3) an atom's ability to form covalent bonds; (4) an atom's ability to pull bonded electrons to itself.
- ___ 24. Which of the following compounds would most likely contain bonds formed by the sharing of electrons? (1) MgO; (2) NO₂; (3) K₂O; (4) SiF₄
- ___ 25. A non metallic representative element of the fourth period was known to form a compound with fluorine in which it had a 1+ oxidation state. Which of the following compounds is it most likely to be? (1) K; (2) As; (3) S; (4) Br.
- ___ 26. In which of the following energy levels is (are) p type orbitals not found? (1) 1; (2) 2; (3) 3; (4) 4; (5) 5; (1,2) 1 and 2; (1,3) 1 and 3; (1,4) 1 and 4.

___ 27. The smartest piece of laboratory glassware is the (1) beaker; (2) test tube; (3) stirring rod; (4) graduate.

___ 28. A kitchen work area. (1) H; (2) Zn; (3) Ba; (4) U; (5) C; (1,2) Ba

Short Answer

Fill in the Chart

The object of this question is to use the periodic properties of the elements to fill in the attached chart. The code letters A to Z have been assigned to the first representative 26 elements (transition elements excluded) on the periodic chart. The code letters do not represent certain chemical symbols (that is, C may not be carbon), nor have the letters been assigned in alphabetical order. These letters are presented in families, and your task is to arrange these letters in the proper sequence on the blank periodic table. To do this, use the clues given which pertain to certain members of each family. The numbers in each square on the table are the atomic numbers of the elements.

The best way to start is to use the clues to find in which group each family of elements belongs, and then to arrange the elements within the family using the other clues. The following elements belong together in families: CYDA, RUPF, GWI, MNX, LEQ, KSO, HBZ, and VJT

CLUES

1. D is the most reactive of the alkali elements
2. Element A is a gas
3. H has 4 electrons in each atom
4. By the number of electrons in its outer orbit atoms of M would be the smallest atom of its group
5. Q is less reactive than L
6. S is the most reactive nonmetal of its group
7. The common oxidation state of E is +3
8. The ionization potential of J is greater than V
9. P has 1 less proton than D
10. R has 8 more electrons than F
11. Atoms of element E are smaller than atoms of H
12. Z is the most reactive alkaline earth element
13. G has 15 protons
14. Atoms of G are smaller than W but larger than I
15. C has one less proton than H
16. K's electron configuration ends up in $3p^4$
17. X has the largest atoms of its group
18. T is the most reactive halogen
19. U is the largest inert element

Extra Credit

1. (3 points) From the standpoint of oxidation states, discuss the possibility of either SiN , SiIn , or SiN existing as a compound. Write your answer to this below the chart on the next page.

The following Periodic Table shows only the Group A elements. Note that the atomic numbers jump from 20 to 31 in the fourth period. This is because

I A						VII A	VIII A
1							2
	II A	III A	IV A	V A	VI A	VII A	
3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18
19	20	31	32	33	34	35	36