

Name \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) What is the electron configuration for the  $\text{Co}^{2+}$  ion? 1) \_\_\_\_\_  
A)  $[\text{Ar}]4s^23d^9$   
B)  $[\text{Ne}]3s^23p^{10}$   
C)  $[\text{Ar}]4s^03d^5$   
D)  $[\text{Ar}]4s^03d^7$   
E)  $[\text{Ar}]4s^13d^6$
- 2) \_\_\_\_\_ is a unique element and does not truly belong to any family. 2) \_\_\_\_\_  
A) Nitrogen      B) Uranium      C) Hydrogen      D) Radium      E) Helium
- 3) Which one of the following represents an impossible set of quantum numbers for an electron in an atom? (arranged as n, l,  $m_l$ , and  $m_s$ ) 3) \_\_\_\_\_  
A) 5, 4, -3, -1/2  
B) 3, 3, 3, 1/2  
C) 2, 1, -1, -1/2  
D) 1, 0, 0, 1/2  
E) 5, 4, -3, 1/2
- 4) Of the elements below, \_\_\_\_\_ is the most metallic. 4) \_\_\_\_\_  
A) barium  
B) calcium  
C) cesium  
D) sodium  
E) magnesium
- 5) Which element would be expected to have chemical and physical properties closest to those of fluorine? 5) \_\_\_\_\_  
A) Ne      B) S      C) Cl      D) O      E) Fe

**ESSAY. Write your answer in the space provided or on a separate sheet of paper.**

- 6) Draw the lewis structure and calculate the formal charge for each atom.  
 $\text{SO}_4^{2-}$

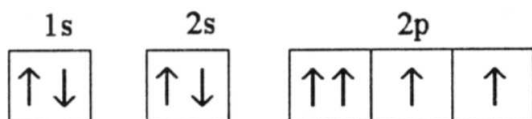
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

7) Which ion below has the largest radius? 7) \_\_\_\_\_  
 A)  $K^+$                       B)  $F^-$                       C)  $Cl^-$                       D)  $Br^-$                       E)  $Na^+$

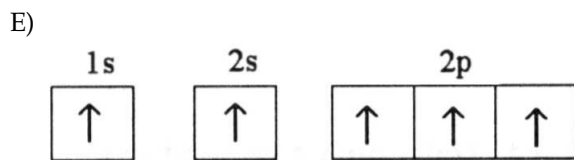
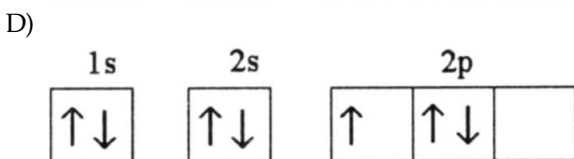
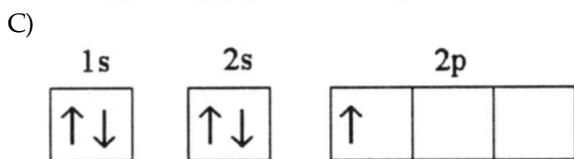
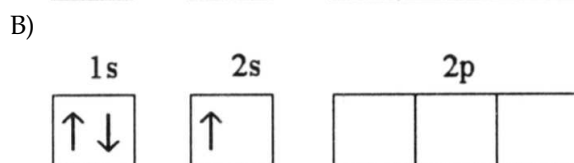
8) Which one of the following elements has the largest atomic radius? 8) \_\_\_\_\_  
 A) Se                      B) Sb                      C) Te                      D) As                      E) S

9) All of the \_\_\_\_\_ have a valence shell electron configuration  $ns^1$ . 9) \_\_\_\_\_  
 A) halogens  
 B) alkaline earth metals  
 C) noble gases  
 D) alkali metals  
 E) chalcogens

10) Which electron configuration represents a violation of the Pauli exclusion principle? 10) \_\_\_\_\_  
 A)



ANSWER



11) What is the correct ground- state electron configuration for molybdenum \_\_\_\_\_? 11) \_\_\_\_\_

- A)  $[Kr]5s^14d^{10}$
- B)  $[Kr]5s^24d^4$
- C)  $[Kr]5s^24d^5$
- D)  $[Kr]5s^14d^5$
- E)  $[Kr]5s^24d^9$

- 12) which one of the following will have the maximum lattice energy 12) \_\_\_\_\_  
 NaF, CsI and CaO  
 A) **CaO** B) NaF  
 C) CsI D) They all have equal energies.
- 13) The valence shell of the element X contains 2 electrons in a 5s subshell. Below that shell, element X 13) \_\_\_\_\_  
 has a partially filled 4d subshell. What type of element is X?  
 A) halogen  
 B) alkali metal  
 C) **transition metal**  
 D) main group element  
 E) chalcogen
- 14) Arrange the following set of atoms and ions in increasing size. Refer to the periodic table for 14) \_\_\_\_\_  
 guidance.  
 Se<sup>2-</sup> Te<sup>2-</sup> and Se  
 A) **Se < Se<sup>2-</sup> < Te<sup>2-</sup>** B) Se < Te<sup>2-</sup> < Se<sup>2-</sup> C) Se<sup>2-</sup> < Se < Te<sup>2-</sup>
- 15) The halogens, alkali metals, and alkaline earth metals have \_\_\_\_\_ valence electrons, 15) \_\_\_\_\_  
 respectively.  
 A) 2, 7, and 4 B) 7, 4, and 6 C) **7, 1, and 2** D) 8, 2, and 3 E) 1, 5, and 7
- 16) For a given arrangement of ions, the lattice energy increases as ionic radius \_\_\_\_\_ and as ionic 16) \_\_\_\_\_  
 charge \_\_\_\_\_.  
 A) increases, decreases  
 B) **decreases, increases**  
 C) increases, increases  
 D) decreases, decreases  
 E) This cannot be predicted.
- 17) Of the following, \_\_\_\_\_ cannot accommodate more than an octet of electrons. 17) \_\_\_\_\_  
 A) As B) I C) P D) **O** E) S
- 18) \_\_\_\_\_ - orbitals are spherically symmetrical. 18) \_\_\_\_\_  
 A) f B) **s** C) d D) g E) p
- 19) Electronegativity \_\_\_\_\_ from left to right within a period and \_\_\_\_\_ from top to bottom 19) \_\_\_\_\_  
 within a group.  
 A) increases, stays the same  
 B) stays the same, increases  
 C) **increases, decreases**  
 D) increases, increases  
 E) decreases, increases
- 20) Of the following elements, which has the largest first ionization energy? 20) \_\_\_\_\_  
 A) Na B) **Cl** C) Se D) Al E) Br

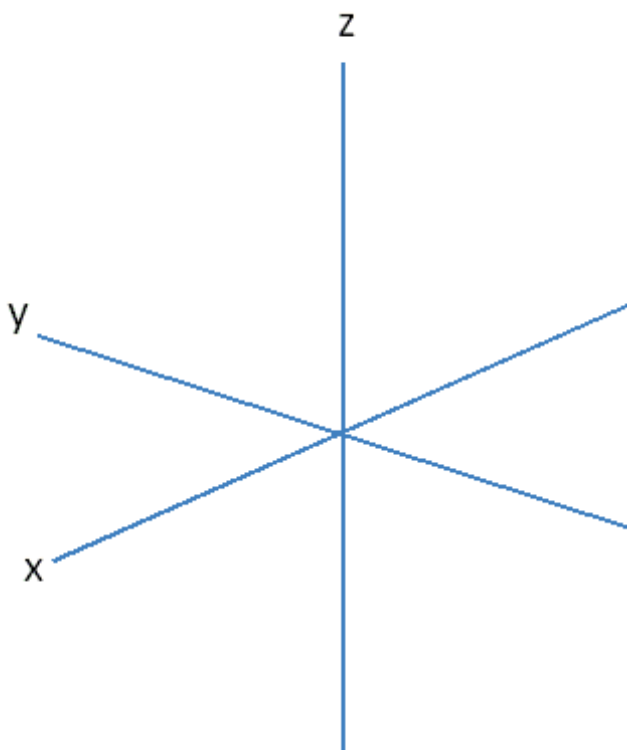
21) A nonpolar bond will form between two \_\_\_\_\_ atoms of \_\_\_\_\_ electronegativity.

21) \_\_\_\_\_

- A) similar, different
- B) identical, different
- C) identical, equal
- D) different, opposite
- E) different, different

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

22) Draw the dxz orbital



CHECK POGIL SHEET FOR ANSWERS

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

23) Which one of the following is a metalloid?

23) \_\_\_\_\_

- A) Pb
- B) Ge
- C) C
- D) S
- E) Br

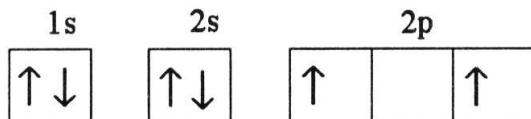
24) The atomic radius of main- group elements generally increases down a group because \_\_\_\_\_.

24) \_\_\_\_\_

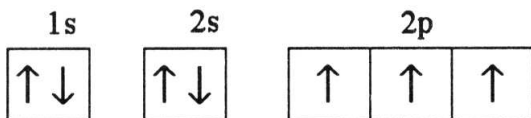
- A) effective nuclear charge increases down a group
- B) the principal quantum number of the valence orbitals increases
- C) effective nuclear charge zigzags down a group
- D) effective nuclear charge decreases down a group
- E) both effective nuclear charge increases down a group and the principal quantum number of the valence orbitals increases

25) Which electron configuration represents a violation of Hund's rule for an atom in its ground state? 25) \_\_\_\_\_

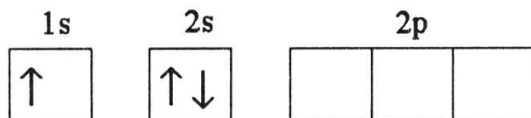
A)



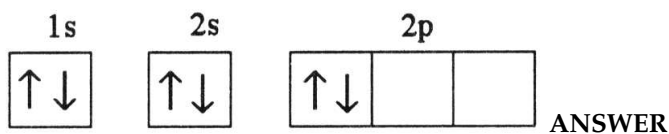
B)



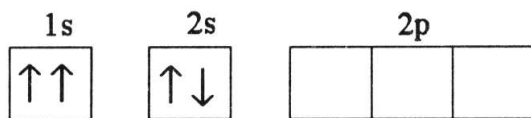
C)



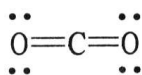
D)



E)



26) The formal charge on carbon in the molecule below is \_\_\_\_\_. 26) \_\_\_\_\_



- A) +1                      B) +3                      C) 0                      D) +2                      E) -1

27) Elements from opposite sides of the periodic table tend to form \_\_\_\_\_. 27) \_\_\_\_\_

- A) homonuclear diatomic compounds  
 B) covalent compounds  
 C) covalent compounds that are gaseous at room temperature  
 D) compounds that are gaseous at room temperature  
 E) **ionic compounds**

28) Which one of the following compounds would produce an acidic solution when dissolved in water? 28) \_\_\_\_\_

- A) CO<sub>2</sub>                      B) MgO                      C) Na<sub>2</sub>O                      D) CaO                      E) SrO

29) Of the atoms below, \_\_\_\_\_ is the most electronegative. 29) \_\_\_\_\_

- A) O                      B) Cl                      C) N                      D) F                      E) Br