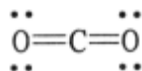
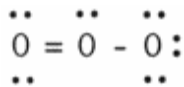


Chapter 8, Basic Concepts of Chemical Bonding

- 1) There are _____ paired and _____ unpaired electrons in the ground state e- configuration of a phosphorus atom.
- 2) In the Lewis symbol for a fluorine atom, there are _____ paired and _____ unpaired electrons.
- 3) Which of the following would have to lose two electrons in order to achieve a noble gas electron configuration _____? O Sr Na Se Br
- 4) Which of the following would have to gain two electrons in order to achieve a noble gas electron configuration _____? O Sr Na Se Br
- 5) For a given arrangement of ions, the lattice energy increases as ionic radius _____ and as ionic charge _____.
- 6) Elements from opposite sides of the periodic table tend to form _____.
A) covalent compounds
B) ionic compounds
C) compounds that are gaseous at room temperature
D) homonuclear diatomic compounds
E) covalent compounds that are gaseous at room temperature
- 7) How many single covalent bonds must a silicon atom form to have a complete octet in its valence shell?
- 8) A double bond consists of _____ pairs of electrons shared between two atoms.
- 9) What is the maximum number of double bonds that a hydrogen atom can form?
- 10) What is the maximum number of double bonds that a carbon atom can form?
- 11) In the molecule below, which atom has the largest partial negative charge _____?
- $$\begin{array}{c} \text{Cl} \\ | \\ \text{F} - \text{C} - \text{Br} \\ | \\ \text{I} \end{array}$$
- 12) Given the electronegativities below, which covalent single bond is most polar?
- | | | | | |
|--------------------|-----|-----|-----|-----|
| Element: | H | C | N | O |
| Electronegativity: | 2.1 | 2.5 | 3.0 | 3.5 |
- A) C-H B) N-H C) O-H D) O-C E) O-N
- 13) A nonpolar bond will form between two _____ atoms of _____ electronegativity.
A) different, opposite
B) identical, different
C) different, different
D) similar, different
E) identical, equal
- 14) The Lewis structure of AsH_3 shows _____ nonbonding electron pair(s) on As.
- 15) The Lewis structure of PF_3 shows that the central phosphorus atom has _____ nonbonding and _____ bonding electron pairs.
- 16) The formal charge on carbon in the molecule below is _____.



17) In the resonance form of ozone shown below, the formal charge on the central oxygen atom is _____.



21) Lattice energy is _____.

- A) the energy required to convert a mole of ionic solid into its constituent ions in the gas phase
- B) the energy given off when gaseous ions combine to form one mole of an ionic solid
- C) the energy required to produce one mole of an ionic compound from its constituent elements in their standard states
- D) the sum of ionization energies of the components in an ionic solid
- E) the sum of electron affinities of the components in an ionic solid

22) The type of compound that is most likely to contain a covalent bond is _____.

- A) one that is composed of a metal from the far left of the periodic table and a nonmetal from the far right of the periodic table
- B) a solid metal
- C) one that is composed of only nonmetals
- D) held together by the electrostatic forces between oppositely charged ions
- E) There is no general rule to predict covalency in bonds.

23) In which of the molecules below is the carbon-carbon distance the shortest?

- A) $\text{H}_2\text{C}=\text{CH}_2$
- B) $\text{H}-\text{C}\equiv\text{C}-\text{H}$
- C) $\text{H}_3\text{C}-\text{CH}_3$
- D) $\text{H}_2\text{C}=\text{C}=\text{CH}_2$
- E) $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_3$

24) Which of the following has the bonds correctly arranged in order of increasing polarity?

- A) $\text{Be}-\text{F}$, $\text{Mg}-\text{F}$, $\text{N}-\text{F}$, $\text{O}-\text{F}$
- B) $\text{O}-\text{F}$, $\text{N}-\text{F}$, $\text{Be}-\text{F}$, $\text{Mg}-\text{F}$
- C) $\text{O}-\text{F}$, $\text{Be}-\text{F}$, $\text{Mg}-\text{F}$, $\text{N}-\text{F}$
- D) $\text{N}-\text{F}$, $\text{Be}-\text{F}$, $\text{Mg}-\text{F}$, $\text{O}-\text{F}$
- E) $\text{Mg}-\text{F}$, $\text{Be}-\text{F}$, $\text{N}-\text{F}$, $\text{O}-\text{F}$

25) Resonance structures differ by _____.

- A) number and placement of electrons
- B) number of electrons only
- C) placement of atoms only
- D) number of atoms only
- E) placement of electrons only

26) For resonance forms of a molecule or ion, _____.

- A) one always corresponds to the observed structure
- B) all the resonance structures are observed in various proportions
- C) the observed structure is an average of the resonance forms
- D) the same atoms need not be bonded to each other in all resonance forms
- E) there cannot be more than two resonance structures for a given species

27) As the number of covalent bonds between two atoms increases, the distance between the atoms _____ and the strength of the bond between them _____.

- A) increases, increases
- B) decreases, decreases
- C) increases, decreases
- D) decreases, increases
- E) is unpredictable

28) Draw the most stable Lewis structure (or 'explain multiple stable resonance structures) of they following:

In each case give the bond order of the 'actual' structure.

- (i) NO_2^-
- (ii) SO_3^{2-}
- (iii) SO_4^{2-}
- (iv) Br_3^-
- (v) SO_2