

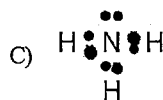
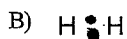
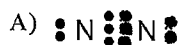
Name: \_\_\_\_\_

- Which element has the *lowest* electronegativity?  
A) fluorine                      B) oxygen                      C) carbon                      D) nitrogen
- In which compound do the atoms have the *greatest* difference in electronegativity?  
A) LiI                      B) AlCl<sub>3</sub>                      C) KF                      D) NaBr
- Which electronegativity is possible for an alkali metal?  
A) 1.0                      B) 2.0                      C) 3.0                      D) 4.0
- Which atom has the *strongest* attraction for electrons?  
A) Cl                      B) F                      C) I                      D) Br
- Given the electron-dot formula:

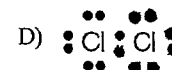
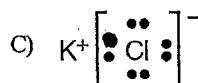
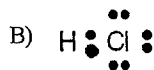
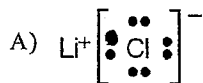
Which atom represented as *X* would have the *least* attraction for the electrons that form the bond?

- Br                      B) Cl                      C) I                      D) F
- In which compound have electrons been transferred to the oxygen atom?  
A) NO<sub>2</sub>                      B) Na<sub>2</sub>O                      C) N<sub>2</sub>O                      D) CO<sub>2</sub>
- Which bond has the *greatest* degree of ionic character?  
A) Cl—Cl                      B) K—Cl                      C) H—Cl                      D) I—Cl
- Element *M* has an electronegativity of less than 1.2 and reacts with bromine to form the compound MBr<sub>2</sub>. Element *M* could be  
A) Na                      B) Al                      C) Ca                      D) K
- Which type of bond is formed by the transfer of electrons from one atom to another?  
A) a covalent bond                      C) an ionic bond  
B) a hydrogen bond                      D) a coordinate covalent bond
- When ionic bonds are formed, metallic atoms tend to  
A) lose electrons and become positive ions                      C) lose electrons and become negative ions  
B) gain electrons and become positive ions                      D) gain electrons and become negative ions
- What type of bonds are formed when calcium atoms react with oxygen atoms?  
A) polar covalent                      C) hydrogen  
B) ionic                      D) coordinate covalent
- When a reaction occurs between atoms with ground state electron configurations  $1s^2 2s^1$  and  $1s^2 2s^2 2p^5$ , the predominant type of bond formed is  
A) metallic                      B) nonpolar covalent                      C) ionic                      D) polar covalent
- What type of bonds are formed when two non-metal atoms combine?  
A) ionic bonds                      B) network bonds                      C) covalent bonds                      D) metallic bonds
- A molecule of ammonia (NH<sub>3</sub>) contains  
A) neither covalent nor ionic bonds                      C) both covalent and ionic bonds  
B) covalent bonds, only                      D) ionic bonds, only
- What type of bond is present in a water molecule?  
A) ionic                      B) electrovalent                      C) polar covalent                      D) nonpolar covalent
- Which combination of atoms can form a polar covalent bond?  
A) Na and Br                      B) H and Br                      C) N and N                      D) H and H

17) Which molecule contains a polar covalent bond?



18) Which electron-dot diagram represents a molecule that has a polar covalent bond?



19) In a nonpolar covalent bond, electrons are

A) located in a mobile "sea" shared by many ions

C) shared equally by two atoms

B) shared unequally by two atoms

D) transferred from one atom to another

20) The electrons in a bond between two iodine atoms ( $\text{I}_2$ ) are shared

A) equally, and the resulting bond is polar

C) equally, and the resulting bond is nonpolar

B) unequally, and the resulting bond is nonpolar

D) unequally, and the resulting bond is polar

21) Which molecule is nonpolar and contains a nonpolar covalent bond?

A)  $\text{HCl}$

B)  $\text{F}_2$

C)  $\text{HF}$

D)  $\text{CCl}_4$

22) Which formula represents a polar molecule containing polar covalent bonds?

A)  $\text{CO}_2$

B)  $\text{H}_2\text{O}$

C)  $\text{Cl}_2$

D)  $\text{NaCl}$

23) ~~Which formula represents a tetrahedral molecule?~~

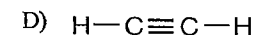
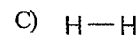
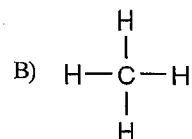
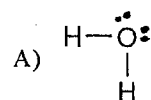
~~A)  $\text{B}_2$~~

~~B)  $\text{CH}_4$~~

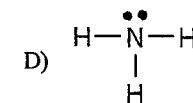
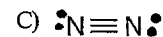
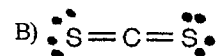
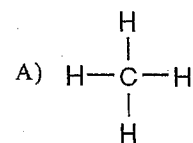
~~C)  $\text{HBr}$~~

~~D)  $\text{CaCl}_2$~~

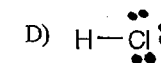
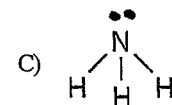
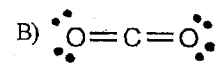
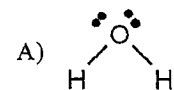
24) Which structural formula represents a polar molecule?



25) Which structural formula represents a polar molecule?



26) Which molecule is nonpolar?



27) What type of bond is present in copper wire?

A) covalent

B) ionic

C) metallic

D) electrovalent

28) Which substance contains particles held together by metallic bonds?

A)  $\text{N}_2(\text{s})$

B)  $\text{Ni}(\text{s})$

C)  $\text{I}_2(\text{s})$

D)  $\text{Ne}(\text{s})$

29. Which of the following statements is incorrect?
- Ionic bonding results from the transfer of electrons from one atom to another.
  - Dipole moments result from the unequal distribution of electrons in a molecule.
  - The electrons in a polar bond are found nearer to the more electronegative element.
  - A molecule with very polar bonds can be nonpolar.
  - Linear molecules cannot have a net dipole moment.
30. Atoms having greatly differing electronegativities are expected to form:
- no bonds
  - polar covalent bonds
  - nonpolar covalent bonds
  - ionic bonds
  - covalent bonds
31. Atoms with very similar electronegativity values are expected to form
- no bonds.
  - covalent bonds.
  - triple bonds.
  - ionic bonds.
  - none of these
32. Which of the following bonds is least polar?
- C—O
  - H—C
  - S—Cl
  - Br—Br
  - They are all nonpolar.
33. For the elements Rb, F, and O, the order of increasing electronegativity is:
- Rb < F < O
  - Rb < O < F
  - O < F < Rb
  - F < Rb < O
  - None of these
34. Based on electronegativities, which of the following would you expect to be most ionic?
- N<sub>2</sub>
  - CaF<sub>2</sub>
  - CO<sub>2</sub>
  - CH<sub>4</sub>
  - CF<sub>4</sub>
35. Which of the following groups contains no ionic compounds?
- HCN, NO<sub>2</sub>, Ca(NO<sub>3</sub>)<sub>2</sub>
  - PCl<sub>5</sub>, LiBr, Zn(OH)<sub>2</sub>
  - KOH, CCl<sub>4</sub>, SF<sub>4</sub>
  - NaH, CaF<sub>2</sub>, NaNH<sub>2</sub>
  - CH<sub>2</sub>O, H<sub>2</sub>S, NH<sub>3</sub>
36. The electron pair in a C-F bond could be considered
- closer to C because carbon has a larger radius and thus exerts greater control over the shared electron pair.
  - closer to F because fluorine has a higher electronegativity than carbon.
  - closer to C because carbon has a lower electronegativity than fluorine.
  - an inadequate model since the bond is ionic.
  - centrally located directly between the C and F.
37. Which of the following bonds would be the most polar without being considered ionic?
- Mg-O
  - C-O
  - O-O
  - Si-O
  - N-O
- Use the following to answer question 10:
- Using the following electronegativity values:
- |   |     |    |     |
|---|-----|----|-----|
| C | 2.5 | Cl | 3.2 |
| H | 2.2 | N  | 3.0 |
|   |     | O  | 3.4 |
- Select from the following group the molecule that fits the given statement:
- CH<sub>3</sub>CHO
  - CO<sub>2</sub>
  - CH<sub>3</sub>Cl
  - C<sub>2</sub>H<sub>6</sub>
  - none

