Unit IV Answers

Pg 165

1. Noble gases are unreactive because they have full energy levels – 0 or 8 valence electrons (except for helium which still has a full energy level with two electrons).

2. The valence electrons are the electrons in the outermost energy level.

3. A cation has a positive charge caused by an atom losing one or more electrons. An anion has a negative charge caused by an atom gaining one or more electrons.

4. Atoms lose or gain electrons to achieve a noble gas electron configuration.

5. Ions have different electron configurations. They have either lost or gained one or more electrons.

6. They easily give up their one valance electron.

7. The number of valence electrons can be determined by which group the element is in on the periodic table.

8. Metals have few valence electrons and the energy to remove the electrons is less than the energy released to gain electrons.

9. Oxygen is very reactive so its atoms will react with each other to form molecules.

10. a) gain one electron b) lose two electrons c) gain three electrons d) no change

11. a) $1s^2 2s^2 2p^6$ b) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$ c) $1s^2 2s^2 2p^6 3s^2 3p^6$ d) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$

12. It has the same number of protons and neutrons.

13. Less energy is required to add three electrons than to remove five electrons.

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1. The force that holds ions together is the electrostatic attraction of opposite charges.

2. An ionic bond is the electrostatic attraction of oppositely charged ions.

8. a) both are nonmetals b) helium has a stable electron configuration and is very unlikely to react.
   c) both sodium and lithium are metals that from cations.

Pgs 183-186

1. An ion has a different number of electrons.

2. To form a cation an atom must lose one or more electrons.

3. To form an anion an atom must gain one or more electrons.

4. Atoms gain or lose electrons until they have 8 valence electrons.

5. Elements with one, two or three valence electrons will most likely form cations. Elements with five, six, or seven valence electrons will most likely form anions.

8. Arsenic atoms have five valence electrons. As^{3-}

37. Gaining a proton will change the kind of atom. If sodium gains a proton it will be come a magnesium ion.

40. a) one to one b) one metal to two halogens c) two metals to one of group 16 d) one to one

Pg 198

1. The nucleus of an atom attracts the electrons of another at the same time repelling the nucleus of the other. The electrons of the two atoms also repel each other. When the force of the attraction is equal to the force of the repulsion the atoms will maintain this distance.

3. Atoms may form a pure covalent bond with equal sharing or unequal sharing to form a polar covalent bond.

4. The potential energy of the atoms decrease (energy is released) and the stability increases.

14. Cesium and bromine would be the most ionic.

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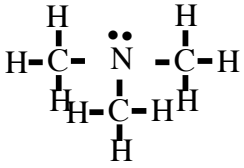
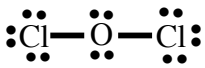
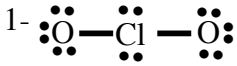
6. 

7. a) 

b) 

c) 

d) 

9. a) tin (IV) iodide b) dinitrogen trioxide c) phosphorous trichloride d) carbon diselenide

10. a) Pbr_5 b) P_2O_3 c) $AsBr_3$ d) CCl_4

13. The prefix *mono* is not used on the first element of a binary covalent compound.

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2. A shared pair is two electrons forming a covalent bond between two atoms. An unpaired share are two electrons in on orbital that are not being shared in a bond.

7. The electronegativity values are used to determine the polarity of a bond.

8. Six electrons are shared in a triple covalent bond.

9. In a polar covalent bond there is unequal sharing of the bonding electrons.

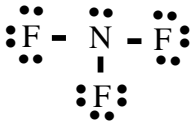
10. The bond energy is the energy required to break the covalent bond, the energy required to separate the two atoms.

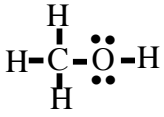
11. A covalent bond happens when two atoms share electrons. An ionic bond is the electrostatic attraction from oppositely charged ions attracting each other. In an ionic bond one atom transfers one or more electrons to another atom.

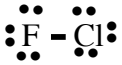
15. a) ionic b) polar covalent c) nonpolar covalent d) polar covalent e) polar covalent
f) covalent g) nonpolar covalent h) ionic

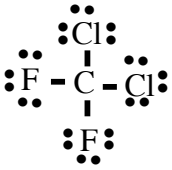
18. The electronegativity difference between the two atoms determines the bond's electron distribution. The more electronegative atom "has" the electrons more than the less electronegative atom.

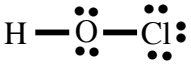
26. a) sulfur tetrafluoride b) xenon tetrafluoride c) phosphorous pentabromide
d) dinitrogen pentoxide e) trisilicon tetranitride f) phosphorous tribromide
g) trineptunium octoxide

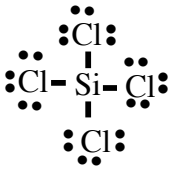
32. a) 

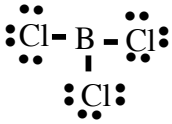
b) 

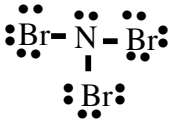
c) 

d) 

e) 

41. a) silicon tetrachloride 

b) boron trichloride 

c) nitrogen tribromide 

60. a) covalent compounds b) electrons c) polar d) nonpolar e)Lewis Structures f) dipoles