Name : _____

Building Molecular Compounds

I. The following pieces of the Molecular Model Set are used to create compounds (*unless stated otherwise*) :

Carbon = Black (4 Holes)

Hydrogen = White (1 Hole)

Oxygen = Red (2 Holes)

Nitrogen = Blue (3 or 4 Holes)

Sulfur = Yellow (4 Holes)

Halogen = Green (1 Hole)

White Plugs = Ion Charges *(not being used)*

Short Grey Plugs = Single Bonds

Long Grey Plugs = Double or Triple Bonds

Tan Tool = *used to pry plugs from atoms*

II. For each molecule, determine the structural formula and draw the molecule you create.

A. Diatomic Elements

1. Hydrogen - H_2

Structural Formula Molecule Drawing

2. Chlorine - Cl_2

Structural Formula Molecule Drawing

3. Oxygen - O_2

Structural Formula Molecule Drawing

4. Nitrogen - N_2

Structural Formula Molecule Drawing

Name : _____

B. Alkanes - *(composed of hydrogen, carbon and contain <u>single</u> bonds; Generic Formula = C_nH_{2n+2})*

1. Methane - CH_4 *(major component of natural gas)*

Structural Formula Molecule Drawing

2. Ethane - C_2H_6 *(converted to ethylene to make plastics)*

Structural Formula Molecule Drawing

3. Propane - C_3H_8 *(used in home & water heating, cooking, refrigeration, clothes drying)*

Structural Formula Molecule Drawing

4. Butane - C_4H_{10} *(used in camping cooking, cigarette lighters, deodorants)*

Structural Formula Molecule Drawing

5. Pentane - C_5H_{12} *(used in the production of polystyrene)*

Structural Formula Molecule Drawing

6. Hexane - C_6H_{14} *(additive in gasoline, glue, varnish, & inks)*

Structural Formula Molecule Drawing

Name : _____

C. Alkenes - *(composed of hydrogen, carbon and contain a double bonds; Generic Formula = C_nH_{2n})*

1. Ethylene - C_2H_4 *(used to make plastics; anti-freeze)*

Structural Formula Molecule Drawing

2. Propylene - C_3H_6 *(used to make plastics for injection molding and fibers)*

Structural Formula Molecule Drawing

3. 1-Butene - C_4H_8 *(used in production of gasoline and rubber processing)*

Structural Formula Molecule Drawing

4. 1-Pentene - C_5H_{10} *(used as a pesticide and gasoline additive)*

Structural Formula Molecule Drawing

D. Alkynes - *(composed of hydrogen, carbon and contain a triple bonds; Generic Formula = C_nH_{2n-2})*

1. Acetylene - C_2H_2 *(used in brazing, cutting, & metallurgical heating & hardening; plastic production)*

Structural Formula Molecule Drawing

Name : _____

2. Propyne - C_3H_4 *(alternative to acetylene; rocket fuel for space craft)*

Structural Formula Molecule Drawing

3. 1-Butyne - C_4H_6 *(used in specialty gas mixtures for instrument calibration)*

Structural Formula Molecule Drawing

4. 1-Hexyne - C_6H_{10} *(used in the pharmaceutical industry)*

Structural Formula Molecule Drawing

E. Cyclic Hydrocarbons - *(form a ring of covalently-bonded carbon atoms)*

1. Cyclopropane - C_3H_6 *(used as a general anesthetic)*

Structural Formula Molecule Drawing

2. Cyclobutane - C_4H_8 *(used in pharmaceutical compounds)*

Structural Formula Molecule Drawing

3. Cyclopentane - C_5H_{10} *(used in the manufacturing of synthetic resins and rubber adhesives)*

Structural Formula Molecule Drawing

Name : _____

F. Angles & Types

1. Angular - H_2O (water)

Structural Formula Molecule Drawing

2. Pyramidal - NH_3 (ammonia) - *USE 3-HOLE BLUE AND WHITE ATOMS*

Structural Formula Molecule Drawing

3. Tetrahedral - $SiCl_4$ (silicon tetrachloride) - *USE 4-HOLE BLUE AND GREEN ATOMS*

Structural Formula Molecule Drawing

G. EXTRA COMPOUNDS

1. Hydrochloric Acid - HCl

Structural Formula Molecule Drawing

2. Carbon Dioxide - CO_2

Structural Formula Molecule Drawing

3. Ethanol - C_2H_5OH

Structural Formula Molecule Drawing

Name : _____

4. Carbonic Acid - H_2CO_3

Structural Formula Molecule Drawing

5. Sulfuric Acid - H_2SO_4

Structural Formula Molecule Drawing

6. Phosphoric Acid - H_3PO_4

Structural Formula Molecule Drawing

7. Glucose - $C_6H_{12}O_6$

Structural Formula Molecule Drawing