**Name: Period: Seat#:**

**S-47, 48, 49, 50, 51**

**Directions:** Try these problems. If you can DO them, check the box (🗹).   
If you CANNOT do them, write some notes TO YOURSELF about what you need to study to succeed at these problems.

A picture containing chart

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**S47 – Quick Check #1**

🞎 **Potential Energy Diagrams**

Sketch the potential energy involved as two hydrogen atoms approach each other.

As the two atoms get closer, the potential energy drops because of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_   
  
(attraction/repulsion) between the \_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The distance when the potential energy is a minimum is called  
  
the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

🞎 **Lewis Structures**

Draw the following ***Lewis Dot Diagrams.***

|  |  |  |  |
| --- | --- | --- | --- |
| Be (ground state) | Be (bonding state) | Si (ground state) | Si (bonding state) |
|  |  |  |  |

Draw the ***Lewis Dot Diagram*** for Calcium Chloride. This compound is \_\_\_\_\_\_\_\_\_\_ (covalent/ionic).

Explain how this bond was formed in terms of the electrons. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Draw the ***Lewis Dot Diagram*** for BeH2. This compound is \_\_\_\_\_\_\_\_\_\_ (covalent/ionic).

Explain how this bond was formed in terms of the electrons.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State the octet rule: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is the compound BeH2 obeying the octet rule? \_\_\_\_\_\_\_\_\_

**S48 – Quick Check #2**

🞎 **Lewis Structures**

Draw the **Lewis structure** for CH3F. Draw the **Lewis structure** for SO2.

🞎 **Formal Charge**

Determine the **formal charge** for each atom in COCl2: Text

Description automatically generated with medium confidence

Draw the **Lewis structure** for CO2.

Then determine the **formal charge** ~~and~~ **~~oxidation number~~** of C in CO2.

Text

Description automatically generated with low confidence

**S49 – Quick Check #3**

🞎 **Orbital Diagrams**

Fill in the orbital diagram for bromine.

🞎 **Mixed Problems**

Write the ***short form electron configuration*** for Bromine: [Ar] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bromine can make five bonds in molecules such as BrF5 Draw the Lewis dot structure for BrF5.

Determine the ***formal charge*** for each atom in BrF5 molecule. Br = \_\_\_\_\_ F = \_\_\_\_\_

Consider the central bromine atom in BrF5:

*# of bonded atoms* = \_\_\_\_ *# of lone pairs* = \_\_\_\_ Steric Number = \_\_\_\_

What is the ***Electron-Pair Geometry*** of BrF5? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the ***Molecular Geometry*** of BrF5? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**S50 – Quick Check #4**

🞎 **Lewis Structures**

Using VSEPR Theory, name and sketch the shape of the following molecules.   
 For extra practice identify formal charges and the electron and molecular geometries of the center atoms.

|  |  |  |
| --- | --- | --- |
| 1. N2 | 1. H2O | 1. CO2 |
| 1. NH3 | 1. CH4 | 1. SO3 |
| 1. HF | 1. CH3OH | 1. H2S |
| 1. I2 | 1. CHCl3 | 1. O2 |

**S51 – Quick Check #5**

🞎 **Mixed Problems**

Draw the Lewis Structure for BF3. Try to draw it in a way that takes into account the three dimensional shape and bond angles based on VSEPR theory. If applicable, correctly place the symbols δ+ and δ- around your drawing to represent any net dipole that may exist.

Based on VSEPR theory, what shape would you assign to the molecule, BF3?

The B-F bond is classified as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Ionic/Polar-Covalent/Non-Polar Covalent)

The molecule, BF3, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ have a net dipole moment. (does/does not)

The molecule, BF3, is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (polar/non-polar)

*Explain the reasoning for your answer:*

🞎 **Bond Energy**

Balance the following equation and calculate the Energy of Formation (ΔHf) of NH3 using the bond energies provided. Write the energy term on the correct side of the equation.

N2 + H2 → NH3

This reaction is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (endothermic/exothermic).

Table 9.9 • Some Average Single- and Multiple-Bond Energies (kJ/mol)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | H | C | N | O | F | Si | P | S | Cl | Br | I |
| H | **436** | **413** | **391** | **463** | **565** | **318** | **322** | **347** | **432** | **366** | **299** |

|  |  |
| --- | --- |
| Multiple Bonds N≡N | 945 |