

1. (6 pts) Consider the compound  $\text{Fe}(\text{NO}_3)_2$ .
  - a. (2 pts) Name this compound.
  - b. (4 pts) In the space below, draw the Lewis structure (2-dimensional, as usual.) Do not draw resonance structures; if there should be resonance structures, state how many there would be.
  
2. (20 pts) Consider only the anion of the above compound:
  - a. (4 pts) Draw the molecular geometry. Show 3-dimensional structure if appropriate; lone pairs do not need to be included.
  
  - b. (2 pts) Approximate the bond angle(s) as accurately as possible.
  - c. (2 pts) Name the molecular geometry of the anion:
  - d. (2 pts) Name the electron domain geometry of the anion:
  - e. (2 pts) How many and what type of hybrid orbitals would be employed by the central atom?
  - f. (4 pts) Re-draw your answer to part a in the space below; then, draw the dipoles for each bond.
  
  - g. (2 pts) Is the anion polar or nonpolar?
  - h. (2 pts) The anion contains \_\_\_\_ sigma bonds and \_\_\_\_ pi bonds.

3. (6 pts) Consider only the cation of the above compound:
- (2 pts) Give the noble gas electronic configuration of the cation.
  - (4 pts) Is the cation diamagnetic or paramagnetic? Briefly describe how you know in 1-2 sentences and/or a labeled drawing.

1. (6 pts) Consider the compound  $\text{CoCO}_3$ .
  - a. (2 pts) Name this compound.
  
  - c. (4 pts) In the space below, draw the Lewis structure (2-dimensional, as usual.) Do not draw resonance structures; if there should be resonance structures, state how many there would be.
  
2. (20 pts) Consider only the anion of the above compound:
  - a. (4 pts) Draw the molecular geometry. Show 3-dimensional structure if appropriate; lone pairs do not need to be included.
  
  - b. (2 pts) Approximate the bond angle(s) as accurately as possible.
  - c. (2 pts) Name the molecular geometry of the anion:
  - d. (2 pts) Name the electron domain geometry of the anion:
  - e. (2 pts) How many and what type of hybrid orbitals would be employed by the central atom?
  - f. (4 pts) Re-draw your answer to part a in the space below; then, draw the dipoles for each bond.
  
  - g. (2 pts) Is the anion polar or nonpolar?
  - h. (2 pts) The anion contains \_\_\_\_ sigma bonds and \_\_\_\_ pi bonds.

3. (6 pts) Consider only the cation of the above compound:
- (2 pts) Give the noble gas electronic configuration of the cation.
  - (4 pts) Is the cation diamagnetic or paramagnetic? Briefly describe how you know in 1-2 sentences and/or a drawing.