

Quiz 9A  
11 points

Name KEY  
Maleckar/960/Fall 2009

1. Write the name for  $\text{Cu}(\text{H}_2\text{O})_4(\text{CN})_2$ .



tetraaqua dicyano cuprate (II)

1 pt: order of ligands

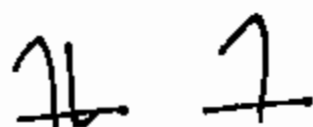
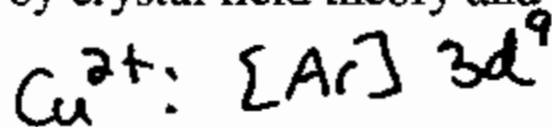
2. What is the oxidation number of the Cu?

+2 1 pt

3. What is the coordination number on the Cu?

6 1 pt

4. Assuming the ligands are strong-binding ligands, draw the d orbitals as predicted by crystal field theory and fill them accordingly.



3 pts.



Is this complex paramagnetic or diamagnetic?

paramagnetic 1 pt

Quiz 9B  
11 points

Name KEY  
Maleckar/960/Fall 2009

1. Name  $[\text{Mn}(\text{NH}_3)_5(\text{NO}_2)]\text{CO}_3$ . All of the following questions relate to this complex.

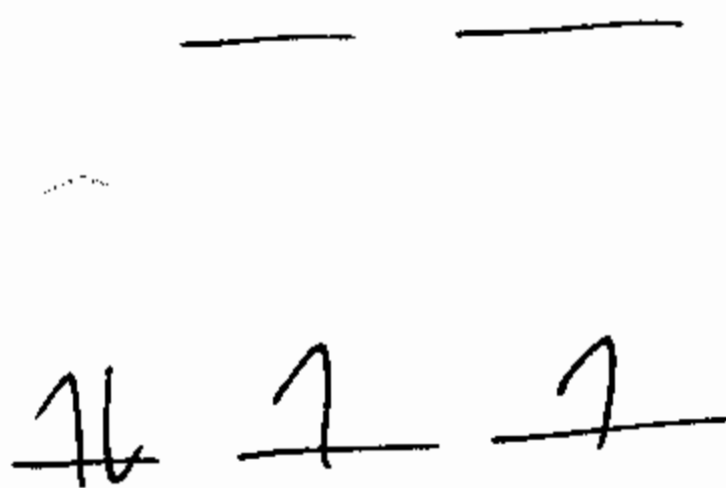
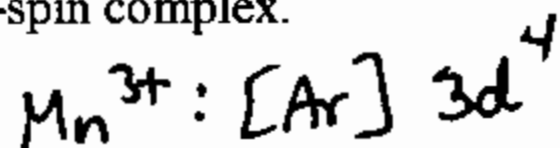
6 pts.  
 $+3$   $0$   $-1$  optional  $-2$   
pentaammine mononitro manganese (III) carbonate

1 pt: ligand order

2. What is the coordination number for the complex in question #1?

6 1 pt

3. Draw the d orbitals as they would be split in this complex and fill it with the appropriate number of electrons for the Mn in the complex in question #1. Assume that it is a low-spin complex.



4. Is this complex paramagnetic or diamagnetic?

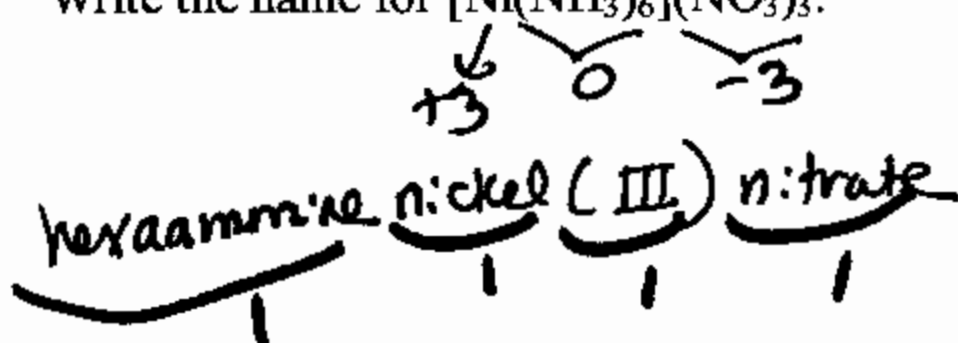
paramagnetic

1 pt

Quiz 9C  
11 points

Name KEY  
Maleckar/960/Fall 2009

1. Write the name for  $[\text{Ni}(\text{NH}_3)_6](\text{NO}_3)_3$ .



name  
1pt: order

5pts.

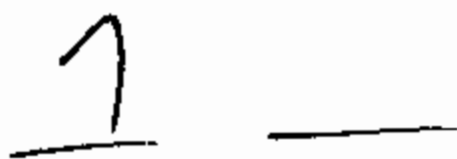
2. What is the coordination number?

6 1pt

3. What is the oxidation number for the Ni?

+3 1pt

4. Assuming the ligands are strong-bonding ligands, draw the d orbital splitting for  $[\text{Ni}(\text{NH}_3)_6](\text{NO}_3)_3$  as predicted by crystal field theory and fill the orbitals accordingly.



3pts.



Is this complex paramagnetic or diamagnetic?

paramagnetic 1pt

Quiz 9D  
11 points

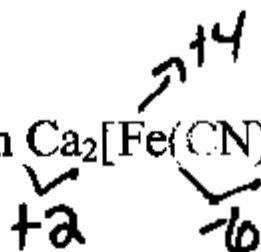
Name KEY  
Maleckar/950/Fall 2009

1. During the formation of a coordination compound, the ligand acts as a \_\_\_\_\_.

- A. Lewis acid
- B. Brønsted acid
- C. Arrhenius acid
- D. Lewis base
- E. Brønsted acid

1 pt  
~~2 pts~~

2. What is the charge on the metal in  $\text{Ca}_2[\text{Fe}(\text{CN})_6]$ ?



+4 1 pt

What is the coordination number in this complex?

6 1 pt

What is the name of this complex?

calcium hexacyano ferrate (IV)

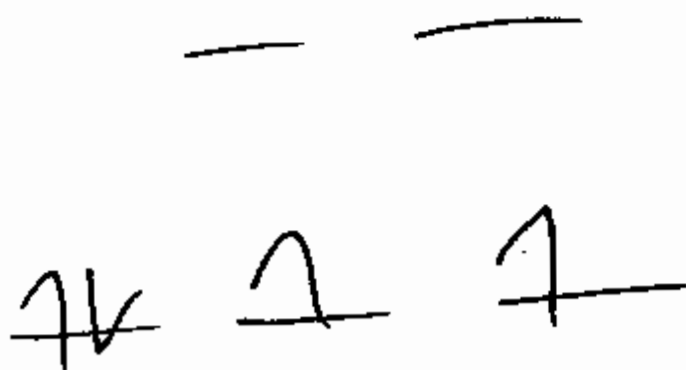
Would you expect this complex to be low-spin or high-spin?

low-spin 2 pts

*ligands bind strongly  
∴ large Δ + low-spin*

How many unpaired electrons would you expect to be in this complex?

2 2 pts



not necessary to draw

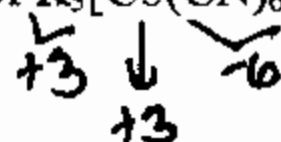
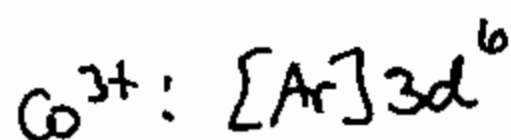
Quiz 9E  
11 points

Name KEY  
Maieckar/950/Fall 2009

1. During the formation of a coordination compound, the metal acts as a \_\_\_\_\_.

- 1pt
- A. Lewis acid
  - B. Brønsted acid
  - C. Arrhenius acid
  - D. Lewis base
  - E. Brønsted acid

2. How many d electrons are in the cobalt ion of  $K_3[Co(CN)_6]$ ? 6 1pt

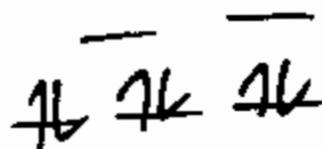


What is the coordination number of this complex? 6 1pt

What is the name of this complex?

potassium hexacyano cobaltate (III)

How many unpaired electrons would you expect in this complex? 0 2pts



Would you expect it to be high-spin or low-spin? low-spin 2pts

CN<sup>-</sup> is a strong ligand

∴ large Δ