Quiz #3: The d-block and stereochemistry

PROBLEM 1-4: Free Response (2 pts each)

1) Name the following complex ions and determine the oxidation number of the metal

$[CoCl(NH_3)_4(H_2O)]^{2+}$

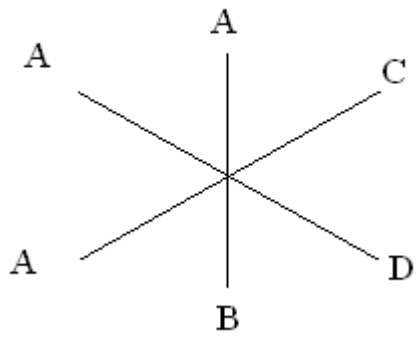
Tetraammineaquachlorocobalt(III) Ion

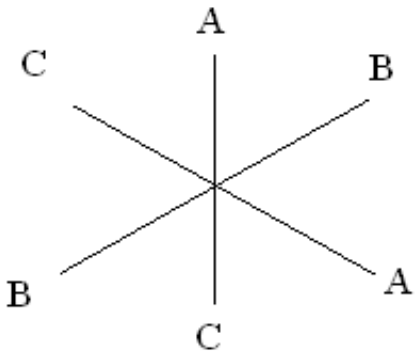
2) Write the formula for the following coordination compound

potassium tris(oxalate)rhodium(III)

$K_3[Rh(C_2O_4)_3]$

3) Is either of the following complexes chiral? If both are chiral, are they an enantiomeric pair?





The one the left is chiral

4) Suggest a reason why copper (II) compounds are often colored but copper (I) compounds are colorless. Which oxidation number results in paramagnetic compounds?

Cu(II) compounds contain one unpaired electron; Cu(I) compounds have no unpaired electrons and thus Cu(II) compounds may be colored and paramagnetic.

Problem 5-9: Multiple Choice (2 points each)

5) Identify the with the larger atomic radius in each of the following pair

A) **Scandium** or Titanium
B) Copper or **Gold**
C) Vanadium or **Niobium**
D) **Tungsten** or Osmium

6) Identify the element with the higher first ionization energy in each of the following pairs:

A) Scandium or **Titanium**
B) **Copper** or Nickel
C) Iron or **Zinc**
D) Iron or **Ruthenium**

7) Which of the following if False?

A) All d-block elements are metals
B) Most of the d-metals are malleable, ductile, and silver-white in color
C) Generally, their melting and boiling points are higher than those in the main-group elements
D) All d-block elements have more than one common oxidation state

8) Which of the following elements are most likely to form an oxide with the formula MO_3

A) Vanadium
B) Chromium
C) Manganese
D) Iron
E) Cobalt

9) Which metal ion has the largest number of valence electrons?

A) V^{2+}
B) Ru^{2+}
C) Rh^{3+}
D) **Cu^{2+}**
E) Os^{4+}