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

\[ \text{[CoCl(NH}_3\text{)}_4(\text{H}_2\text{O})]\text{]}^{2+} \]

**Tetraammineaquachlorocobalt(III) Ion**

2) Write the formula for the following coordination compound

potassium tris(oxalate)rhodium(III)

\[ \text{K}_3[\text{Rh(C}_2\text{O}_4)_3] \]

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

- The one on 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$^{4+}$