1. Determine is the oxidation state of the metal in each of the following complexes. Draw **ALL** linkage isomers and stereoisomers for each complex **CLEARLY** showing enantiomers. **Where possible**, label each isomer as *cis*, *trans*, *fac*, *mer*,  and/or . You must **properly** use shorthand notation for multidentate ligands. Note: do not consider the chirality of ligands and not all isomers can be labeled.

a) K2[Cr(ox)2(NH3)(H2O)]

b) [Rh(en)3]Cl3

c) [WCl4F(OH)]

d) NH4[Ni(CN)3(NH3)BrCl]

e) [Co(en)(ox)(CO)(H2O)]

f) Na2[PtCl2(NO2)2] (square planar)

g) [FeCl2(CO)2(NH3)2](NO3)2

2. For each series of octahedral complexes, **predict** which will have the largest and which will have the smallest value for . Briefly explain your answers. (**Do not** compare actual experimental values).

a) [Fe(H2O)6]3+ [Fe(ox)3]3– [Fe(CN)6]3– [Fe(NO2)6]3–

b) [Cr(SCN)6]3– [Cr(NH3)6]2+ [Cr(NH3)6]3+ [Cr(SCN)6]4–

c) [Ir(H2O)6]3+ [Rh(H2O)6]3+ [Co(H2O)6]2+ [Co(H2O)6]3+

d) [MoCl6]3– [MoF6]3– [MoCl6]2– [MoF6]2–

e) [V(en)3]4+ [Nb(en)3]4+ [V(CN)6]3– [Nb(CN)6]3–