

CHEM 245 PROBLEM SET V

(Hint: 18-electron rule uses the number of electrons that would be donated by ligands if they were neutral.)

- Name the following:
 - $[\text{Co}(\text{N}_3)(\text{NH}_3)_5]\text{SO}_4$
 - $\text{Na}[\text{AlCl}_4]$
 - $[\text{Co}(\text{en})_2\text{CO}_3]\text{Cl}$
- Give structures for
 - Triammineaquadichlorocobalt(III) chloride (all isomers)
 - μ -oxo-bis[pentaamminechromium(III)] ion
 - Potassium diaquabis(oxalato)manganate(III)
- Glycine has the structure $\text{NH}_2\text{CH}_2\text{COOH}$. It can lose a proton from the carboxyl group and form chelate rings bonded through both the N and one of the O atoms. Draw structures for all possible isomers of tris(glycinato)cobalt(III).
- Draw all the isomers for the following. Name the compounds (omitting isomer designation). Indicate clearly each pair of enantiomers:
 - $[\text{Pt}(\text{NH}_3)_3\text{Cl}_3]^+$
 - $[\text{Co}(\text{NH}_3)_2(\text{H}_2\text{O})_2\text{Cl}_2]^+$
 - $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$
 - $[\text{Pt}(\text{bipy})_2\text{BrCl}]^{2+}$
- Is the following molecule chiral?



- Which of the following obey the 18-electron rule?
 - $[\text{Fe}(\text{CO})_5]$
 - $[\text{Rh}(\text{bipy})_2\text{Cl}]^+$
 - $[\text{Re}(\text{PPh}_3)_2\text{Cl}_2\text{N}]$
 - $[\text{Os}(\text{CO})(\equiv\text{CPh})(\text{PPh}_3)_2\text{Cl}]$
- Which of the following square-planar complexes have 16-electron valence configurations?
 - $[\text{Ir}(\text{CO})\text{Cl}(\text{PPh}_3)_2]$
 - $[\text{Ni}(\text{CN})_4]^{2-}$
- On the basis of the 18-electron rule, identify the first-row transition metal in the following:
 - $[\text{H}_3\text{CM}(\text{CO})_5]$
 - $(\eta^3\text{-C}_3\text{H}_5)(\eta^5\text{-C}_5\text{H}_5)\text{M}(\text{CH}_3)(\text{NO})$
- On the basis of the 18-electron rule, determine the charge on the following coordination complexes:
 - $[\text{Co}(\text{CO})_3]^z$
 - $[\text{Ru}(\text{CO})_4(\text{GeMe}_3)]^z$