CHEM 454: Organometallic Chemistry

Topic: 18-Electron Rule

Name: _____ **Roll No.** _____ **Submission date:** _____

Problems: Application of the 18-electron rule

1. **Determine the oxidation state of each M. Identify the 1st-row transition metal and draw the structure.**
   a. $M(CO)(CS)(PPh_3)_2Br$
   b. $[M(CO)_7]^+$
   c. $[(\eta^3\text{-}C_3Ph_3)(\eta^4\text{-}C_4H_4)M(NH_3)_2]^+$
2. **Determine the oxidation state of each M. Identify the 2nd-row transition metal and draw the structure.**
   a. $[M(CO)_3(NO)]^-$ (linear NO)
   b. $(\eta^4\text{-}C_8H_8)M(CO)_3$
   c. $[M(CO)_3(PMe_3)]^-$
3. **Determine the charge, n, for each of the following compounds.**
   a. $[Ru(CO)_4(SiMe_3)]^n$
   b. $[(\eta^6\text{-}C_6H_6)_2Ru]^n$
   c. $[(\eta^3\text{-}C_3H_5)V(CNMe)_5]^n$

Note. Assume all these organometallic compounds obey the 18-electron rule.