

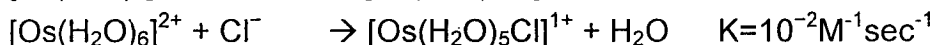
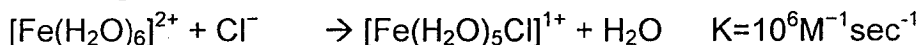
M-3-1

1. Predict and draw the structure and identify the point group for each of the following:

(a) ClF_5 (b) NiCl_4^{2-} (c) ICl_4^- (d) $\text{trans-CoCl}_4\text{F}_2^{3-}$. 20%

2. Starting with $[\text{PtCl}_4]^{2-}$ give stepwise syntheses of all the isomers of $[\text{PtI}(\text{NH}_3)\text{Cl}_2]^{1-}$. 10%

3. Give an explanation for the difference in observed rate constants for the following two reactions: 10%



4. Which ion will exhibit Jahn-Teller distortion when located in an octahedral site (high spin) ? Fe^{3+} , Cr^{3+} , Mn^{3+} , Ti^{3+} 10%

5. Determine the metal-metal bond order consistent with the 18-electron rule for the following:

a. $[(\eta^5\text{-C}_5\text{H}_5)\text{W}(\text{CO})_2]_2$ b. $[(\eta^5\text{-C}_5\text{H}_5)\text{Ru}(\text{CO})_2]_2$. 10%

6. Find the number of unpaired electrons, magnetic moment, and ligand field stabilization energy for each of the following complexes:

a. $\text{Rh}(\text{H}_2\text{O})_6^{2+}$ b. $\text{Fe}(\text{CN})_6^{3-}$ c. CuCl_6^{4-} . 30%

7. Give chemical formulas for 10%

a. triaquadichloromethylaminecobalt(III)

b. sodium diamminebis(oxalate)rhenium(III).