

38

淡江大學八十九學年度碩士班招生考試試題

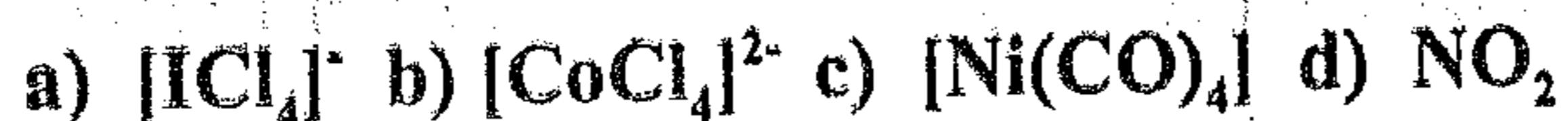
系別：化學學系

科目：無機化學

本試題共 1 頁

TEN POINTS FOR EACH QUESTION

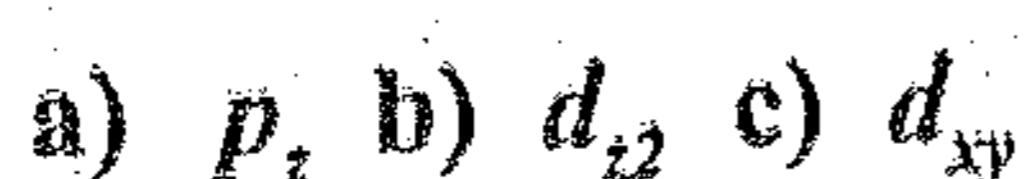
1. Predict the shapes for the following:



2. Using Slater's rules, determine Z^* for a $4s$ and $3d$ electron of Cu. Which type of electron is more likely to be lost when copper forms a positive ion?

3. PCl_5 is a stable molecule, but NCl_5 is not. Explain.

4. Draw and determine the point groups of the following atomic orbitals.

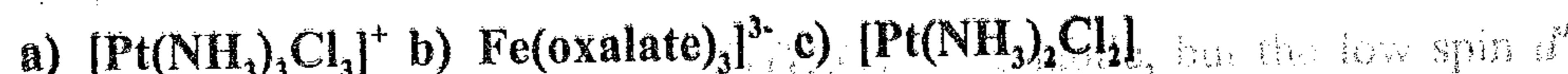


5. Prepare a molecular orbital energy level diagram for NO , showing clearly how the atomic orbitals interact to form MOs. Predict the bond order of NO and NO^+ and the number of unpaired electrons.

6. CsI is much soluble in water than CsF , and LiF is much less soluble than LiI . Why?

7. $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ is a strong oxidizing agent that will oxidize water, while $[\text{Co}(\text{NH}_3)_6]^{3+}$ is stable in aqueous solution. Explain this difference.

8. Sketch all isomers of the following:



9. The high spin d^4 complex ion $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ is labile, but the low spin d^4 complex ion $[\text{Cr}(\text{CN})_6]^{4-}$ is inert. Explain.

10. Draw structure for the following:

a) Ferrocene b) Metallocporphyrin c) Ziegler-Natta catalyst d) Wilkinson complex