淡江大學九十一學年度碩士班招生考試試題

系別：化學系　　科目：無機化學

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本試題共 壹 頁

按照題目順序作答　每題十分

1. The electron configuration of copper in the ground state is $[Ar]3d^{10}4s^1$. Suggest an explanation. How many unpaired electrons of Mn^{2+} ion in its ground state. What is its term symbol?

2. Draw the Born-Haber cycle for NaF crystal. Indicate all the name of enthalpy change (ΔH) you used.

3. The electrical conductivity of germanium is increased by a factor of 10^5 when a few parts per million of arsenic are added. Explain.

4. Suggest a reason why the order of acid strength in the oxo-acids of chlorine is $HClO_4 > HClO_3 > HClO_2$.

5. Suggest a reason for the following observation from orbital and bonding point of view: CO_2 is gaseous whereas SiO_2 is crystalline under normal conditions.

6. Write the molecular orbital energy level diagram and electron configuration for the NO molecule. What is the bond order?

7. Predict the ligand field splitting of d-orbitals, including the name of orbitals, in an octahedral ML_6 complex. Calculate the LFSE (ligand field stabilization energy) in a high spin d^7 ion.

8. Assign the following molecules to point group: a)Ferrocene, b) *trans*-$Ni(NH_3)_4Cl_2$, c) H_2O_2.

9. Give example and describe a) the inner-sphere electron transfer and b) outer-sphere electron transfer mechanism in coordination chemistry.

10. Give example and describe the a) σ-π rearrangement, b) insertion reaction and c) oxidative addition reaction in organometallic chemistry.