

系別：化學學系

科目：無機化學

准帶項目請打「V」

簡單型計算機

本試題共 / 頁

淡江大學化學系碩士班入學考試無機試題

1. To describe the followings (30%)
  - A. Lewis acids and Lewis bases of inorganic molecules
  - B. Effective nuclear charge of atoms
  - C. High-spin states and low-spin states of  $d^{3-7}$  electronic configuration
  - D. Oxidative addition and reductive elimination reaction
  - E. Electronegativity of atoms.
  
2. Use the VSEPR(valence shell pair repulsion theory) models to predict the molecular structures of the following molecules:(15%)
  - A.  $MnO_4^-$ ,  $Ni(CN)_4^{2-}$ ,  $ZnCl_4^{2-}$
  - B.  $ClF_3$ ,  $ICl_2^-$  and  $PCl_5$
  - C.  $SF_6$ ,  $SF_4$ ,  $SF_2$
  
3. Give the factors effect(e.g. oxidation number of metal and properties of ligands) on the electronic absorption spectra of ligand-to-metal charge transfer (LMCT) and metal-to-ligand charge transfer (MLCT). (10%)
  
4. Use the molecular orbital theory to describe why the spectrochemical series (10 Dq size) has the order of  $Cl^- < NH_3 < CN^-$  (20%)
  
5. Give the ground electronic states by term symbol ( $^{2s+1}L$ ) for  $3d^1 \sim 3d^9$  (10%)
  
6. Give the point group symmetry symbols to describe the structures of (15%)

