

系所組：化學系應用化學碩士班

日期節次：102 年 3 月 15 日第 2 節 11:00~12:30

科目：無機化學

1. For each of the following molecules or ions, 24%
 - (a) TeCl_4 (b) XeO_2F_2
 - (1) write the Lewis structure
 - (2) predict the molecular geometry
 - (3) assign the point group
 - (4) give the hybrid orbitals on the central atom
 - (5) find the formal charge of the central atom
 - (6) determine the oxidation number of the central atom.

2. For H_3PO_4 , H_3PO_3 , and H_3PO_2
 - (a) Give names in English 9%
 - (b) Draw the molecular structures 6%
 - (c) Estimate the acid dissociation constants (K_a) or $\text{p}K_a$ for H_3PO_4 . 7%

3. For each of (a) $\text{Mo}(\text{CO})_6$ and (b) $[\text{Ni}(\text{CN})_4]^{2-}$ 24%
 - (1) Predict the magnetic moment.
 - (2) Find ligand field stabilization energy (LFSE).
 - (3) Determine the ground term (term symbol of ground state).
 - (4) Assign point group.
 - (5) Which species will show Jahn-Teller distortion?
 - (6) Which species are paramagnetic?

4. Briefly explain the following terminologies by examples: 30%
 - (1) dissociation (D)
 - (2) oxidative addition
 - (3) cluster compounds.