

淡江大學 99 學年度轉學生招生考試試題

系別：化學學系二年級

科目：普通化學

本試題共五大題，1 頁

應按題目順序作答，列出答題推算步驟。共計五大題，每大題二十分。

- a) Draw the Lewis structure with resonance structures for azide anion, N_3^- . Indicate the value for the formal charge on each atom.

b) Draw the stereo-structure for the compound IF_4^+ .
- a) Draw the molecular orbital energy level diagram of N_2 molecule.

b) Draw Lewis structures of the following ions, PtCl_6^{2-} , NO_3^- , and ClO_4^- . Name the type of hybrid valence orbital and draw an orbital diagram for the hybrid orbital for the center atom.
- a) Describe the first law, second law, and third law of thermodynamics in words of q , w , ΔS , ΔG , ΔE , and ΔH .

b) Write the rate law for a first order and a second order reaction. What is the unit of first order reaction rate constant?
- a) Using the acetic acid(x g), sodium acetate(y g), and water(z mL) to prepare a buffer solution of pH 4.8. The acidity of acetic acid, K_a , is 1.8×10^{-5} .

b) Write the equilibrium chemical reaction of methanol with $\text{K}_2\text{Cr}_2\text{O}_7$ in acidic solution.
- a) Draw the condensed structural formulas for the following compounds: methyl *ter*-butyl ether, isopropyl alcohol, acetaldehyde, polyester, nylon.

b) Draw and name all the possible structural isomers of organic compounds.

atomic weight : C = 12 , H = 1 , O = 16 , Na = 23 , $\log 2 = 0.3$