

淡江大學 97 學年度碩士班招生考試試題

系別：化學學系

B

科目：普通化學

本試題共 1 頁，6 大題

1. Define the following terms (**not** just translation!). (30%)
 - (a) Angular momentum quantum number
 - (b) Arrhenius equation
 - (c) London dispersion forces
 - (d) Enantiomers
 - (e) Salt bridge
 - (f) Condensation polymerization
2. Write formulas for the following compounds: (15%)
 - (a) Diiodine pentoxide
 - (b) Lithium aluminum hydride
 - (c) Ammonium dichromateDraw the structures of the following compounds:
 - (d) *trans*-1,2-dichloroethene
 - (e) 3-bromobenzaldehyde
3. Briefly answer the following questions: (10%)
 - (a) For the bonding in COCl_2 , indicate the number of sigma and pi bonds, the geometry, and the type of hybridization.
 - (b) Write the electronic configuration and determine the charge on phosphorus atom when it forms its most stable ion.
4. (a) Give an example of a buffer solution. Describe the method of preparing the buffer solution (5%)
(b) Derive the expression of the pH value for your buffer solution. Define all the terms used in your derivation. (10%)
5. (a) Calculate the cell potential of a galvanic cell based on the following half-reactions at 25 °C. ($E_1 > E_2$)(10%)
$$\text{A} + 3\text{e}^- \longrightarrow \text{B} \quad E^\circ = E_1 \text{ (Volt)} \quad \text{C} + 4\text{e}^- \longrightarrow \text{D} \quad E^\circ = E_2 \text{ (Volt)}$$
Use E_1 , E_2 , and the initial concentrations $[\text{A}]_0$, $[\text{B}]_0$, $[\text{C}]_0$, and $[\text{D}]_0$ to express E_{cell} .
(b) Derive the expression of the equilibrium constant for the cell reaction in (a). (10%)
6. Calculate the concentration of Ag^+ in a solution prepared by mixing 50.0 mL of 5.2×10^{-3} M AgNO_3 with 50.0 mL of 2.00 M KCN . (10%)



where β is the complex formation constant.