# 國立臺灣師範大學 112 學年度碩士班招生考試試題

科目：**分析化學**　　　　　　　　　適用系所：**化學系**

注意：1.本試題共 1 頁，請依序在答案卷上作答，並標明題號，不必抄題。2.答案必須寫在指定作答區內，否則依規定扣分。

1. An aqueous solution contains $AgBr(S)$ and $NH_3(aq)$. (15 points)
   (a) Please write all equations for the equilibria in the solution.
   (b) Please write the mass balance equations for this solution.
   (c) Please write charge balance equation for this solution.

2. What is "relative supersaturation"? Explain the mechanism of controlling particle size of precipitation through relative supersaturation. (10 points)

3. Describe the experimental procedure of how you prepare a 1-L solution of pH 3.5 using 98% w/w $H_2SO_4$ and water. $K_{a1}$ is completely disassociated and $K_{a2}$ is 0.01. (10 points)

4. Draw the structure of the glass electrode for pH meter. Explain the working principle in brief. (15 points)

5. What is Orbitrap mass spectroscopy? (10 points)

6. Please give the general form of Nernst Equation and explain its meaning and applications. (10 points)

7. Show the instrument structure of an UV-Vis spectrometer using grating as wavelength differentiating mechanism. Explain the principle of grating. (15 points)

8. In chromatography, what is the definition of "theoretical plates"? Explain the meaning of van Deemter equation: $H = A + B/u + Cu$. (15 points)