臺北市立教育大學

九十五學年度研究所碩士班入學考試試題

所　　別：自然科學系碩士班(自然科學組化學類)
科　　目：普通化學
考試時間：90 分鐘【08:20－09:50】
總　　分：100 分

※ **注意**：不必抄題，作答時請將試題題號及答案依照順序寫在答卷上；**限用毛筆、藍色或黑色筆作答**，使用其他顏色或鉛筆作答者，所考科目以零分計算。**(於本試題紙上作答者，不予計分。)**

1. （1）How can thousands of different proteins, with an enormous range of structures and functions, be prepared from a set of only 20 amino acids? (6%)

   （2）Why do scientists distinguish between ionizing and nonionizing radiation? (7%)

   （3）What does it mean when we say that the half-life for the decay of C-14 is 5730years? (7%)

2. Why do periodic tables include hydrogen among both the metals in Group IA and the nonmetals in Group VIIA? (6%)

   How does the ozone in the stratosphere protect us from the high-energy solar radiation? (6%)

3. Why does the pH remains more or less constant during a titration until we get close to the endpoint of the titration? Why does the pH rise so rapidly at the endpoint? (6%)

   Why does a light-blue precipitate form when a small amount of NH_3 is added to an aqueous Cu^{2+} ion solution? (6%)

   Why does this precipitate dissolve to form a dark-blue solution when excess NH_3 is added? (6%)

4. Define each of the following： (12%)

   （1）weak-field ligand （2）low-spin （3）chleate （4）free energy

5. What are the relationships among bond order, bond energy, and bond

length? (14%)

6. Give the point group for the following molecules（1）PO_4^{3-}（2）N_2H_4 （3）SO_3^{2-}（4）N_3 (12%)

7. Define each of the following：

（1）Jahn-Teller effect（2）Inner sphere mechanism（3）VSEPR theory

（4）trans effect (12%)