國立成功大學

113學年度碩士班招生考試試題

編　號：274

系　所：環境醫學研究所

科　目：普通化學

日　期：0202

節　次：第 2 節

備　註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Describe the three laws of thermodynamics. (10%)

2. Draw Lewis structures for all possible isomers of C_4H_8O. (10%)

3. Describe the factors that can influence the boiling point of a pot of soup. (10%)

4. Use a diagram to describe the electronic, vibrational, rotational transitions in spectroscopy. (10%)

5. If 0.400 L of a 0.10 M NaCl solution is concentrated to 20 mL by an evaporator, what is the molarity of the resulting solution? What is the total weight of the resulting solution? (10%)

6. Give the definitions of pH and pKa. What are the differences between these two terms? Calculate the pH of salicylic acid solution when the solution is titrated to contain only 0.01% of salicylates. Use the fact, pKa (salicylic acid) = 2.97, in your calculation. (10%)

7. Apply transition state theory and draw a diagram to show how an enzyme could change the rate of a reaction? Does it change the rate of the reverse reaction? How does an enzyme affect the equilibrium? (10%)

8. Describe or explain the following terms: (30%)
   (A) ppm, ppb, and ppt
   (B) Beer's Law and Henry's Law
   (C) Avogadro constant and dissociation constant