

銘傳大學 98 學年度轉學生招生考試

生物科技學系

7 月 23 日 第四節

普通化學試題

(第 | 頁共 | 頁) (限用答案本作答)

可使用計算機 不可使用計算機

- Write chemical formulas for these compounds: (20pts)
 - hydrogen chloride
 - carbon dioxide
 - chloric acid
 - methane
 - sodium hydroxide
 - zinc iodide
 - hydrocyanic acid
 - carbonic acid
 - potassium dichromate
 - ammonium sulfate

2. Define these terms: a. Buffer solution, b. Enantiomers, c. Hydrolysis, d. pI value, e. Electronegativity. (15pts)

3. Ascorbic acid (vitamin C) cures scurvy and may help prevent the common cold. It is composed of 40.92 percent carbon (C), 4.58 percent hydrogen (H), and 54.50 percent oxygen (O) by mass. Determine its empirical formula. (C:12.01, H: 1.008, O: 16.00) (6pts)

4. Sulfur hexafluoride (SF₆) is a colorless, odorless, very unreactive gas. Calculate the pressure (in atm) exerted by 1.82 moles of the gas in a steel vessel of volume 5.43 L at 69.5°C. (6pts)

5. Given the thermochemical equation:



Calculate the heat evolved when 74.6 g of SO₂ (molar mass = 64.07 g/mol) is converted to SO₃. (6pts)

6. Draw resonance structures (including formal charges) for the nitrate ion (NO₃⁻), which has this skeletal arrangement: (8pts)



7. Which of these molecules has the shortest nitrogen-to-nitrogen bond? Explain. (6pts)



8. The solubility of KNO₃ is 155 g per 100 g of water at 75°C and 38.0 g at 25°C. What mass (in grams) of KNO₃ will crystallize out of solution if exactly 100 g of its saturated solution at 75°C are cooled to 25°C? (6pts)

9. A 0.20-mole quantity of CuSO₄ is added to a liter of 1.20 M NH₃ solution. What is the concentration of Cu²⁺ ions at equilibrium? (6pts)

10. State the second law of thermodynamics in words and express it mathematically. (6pts)

11. A 44.0 g sample of an unknown metal at 99.0°C was placed in a constant-pressure calorimeter containing 80.0 g of water at 24.0°C. The final temperature of the system was found to be 28.4°C. Calculate the specific heat of the metal. (The heat capacity of the calorimeter is 12.4 J/°C.) (6pts)

12. Indicate the number of unpaired electrons present in each of these atoms: B, Ne, P, Sc, Mn, Se, I, W, Pb. (9pts)

試題完