國立臺北科技大學

九十五學年度學士班二、三年級轉學生招生考試

四技二年級 專業科目（二） 普通化學試題

填准考證號碼

注意事項：

1. 本試題共 10 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. How long must a current of 0.80 A flow to form 2.50 g of silver metal in an electroplating experiment ? The cathode reaction is

$$Ag^{+}_{(aq)} + e^{-} \rightarrow Ag_{(s)} \quad (\text{Mw.: Ag=107.9}) \quad 10\%$$

2. The standard cell potential E^{o}_{cell}, for the reduction of silver ions with copper metal is +0.46 V at 25℃. Calculate ΔG^{o} for this reaction.

$$Cu_{(s)} + 2Ag^{+}_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)} \qquad 10\%$$

3. The value of K_{sp} for $AgCl_{(s)}$ at 25℃ is 1.8×10^{-10}. Determine ΔG^{o} for the process $Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$ at 25℃. 10%

4. Suppose you mix 100. mL of 0.02 M $BaCl_2$ with 50.0 mL of 0.03 M Na_2SO_4. Will $BaSO_4$ (K_{sp} =1.1 $\times10^{-10}$) precipitate ? You must calculate to demonstrate your answer. 10%

5. What is the pH of a 0.015 M solution of sodium acetate, $NaCH_3CO_2$ at 25℃ ? The K_b of acetate ion is 5.6×10^{-10} at 25℃. 10%

6. An aqueous solution of ethanol (C_2H_5OH) and acetic acid (CH_3CO_2H), each at an initial concentration of 0.81 M, is heated to 100℃. At equilibrium, the acetic acid concentration is 0.748 M. Calculate K for the reaction

$$C_2H_5OH_{(aq)} + CH_3CO_2H_{(aq)} \rightleftharpoons CH_3CO_2C_2H_{5(aq)} + H_2O_{(l)} \qquad 10\%$$

7. Using values of k determined at two different temperatures, calculate the value of E_a for the decomposition of HI:

$$2HI_{(g)} \rightarrow H_{2(g)} + I_{2(g)}$$

$k=2.15\times10^{-8}$ L/(mol•s) at 6.50×10^{2} K

$k=2.39\times10^{-7}$ L/(mol•s) at 7.00×10^{2} K 10%

8. Suppose 651g of ethylene glycol, $HOCH_2CH_2OH$, is dissolved in 1.5kg of water. What is the pressure of the water over the solution at 90℃ ? Assume ideal behavior for the solution. The vapor pressure of pure water at 90℃ is 525.8mmHg. 10%

9. You place 2.00L of water in your dormitory room, which has a volume of 4.25×10^{4} L. You seal the room and wait for the water to evaporate. How many grams of water will evaporate to achieve an equilibrium water vapor pressure at 25℃ ? (Suppose the vapor of water is ideal gas, and its vapor pressure is 23.8mmHg.) 10%

10. Trtrafluoroethylene, C_2F_4(Mw=100g/mol), effuses through a barrier at a rate of 4.6×10^{-6} mol/h. An unknown gas, consisting of only boron and hydrogen, effuses at a rate of 5.8×10^{-6} mol/h under the same conditions. What is the molar mass of the unknown gas ? 10%