

系級	科目	授課教師	考試日期	學號	姓名
藥二級 甲二組	藥用物理化學	吳宏邦	90年九月12日 14:00-15:10 第三節		

*①請注意本試題共一張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。③可使用簡易型計算器。

Physical Chemistry Final Exam

- The concentration of O_2 in water required to support aquatic life is about 5 mg l^{-1} . What is the minimum partial pressure of O_2 in the atmosphere that can achieve this concentration? Henry's law constant, $K_H = 3.30 \times 10^7 \text{ torr}$. (15%)
- The vapor pressure of benzene is 400 Torr at 60.6°C , but it fell to 379 torr when 0.152 g of an organic compound was dissolved in 5.50 g of the solvent. Calculate the molar mass of the unknown compound. (15%)
- In an industrial process, N_2 at a partial pressure of 1.00 bar is mixed with H_2 at a partial pressure of 3.00 bar. Find the composition of the reaction mixture at equilibrium if $K_c = 990$ at the unspecified temperature. (15%)
- If we are titrating 25.0 ml of 0.20 M $HClO(aq)$ with 0.10 M $NaOH(aq)$ at 25°C , calculate
 - The pH at the start of the titration.
 - The pH after adding 10 ml of $NaOH$.
 - The pH at the stoichiometric point.
 - The pH after adding 60 ml of $NaOH$. Note: $pK_a(HClO) = 7.53$. (20%)
- The rate constant for the 1st-order decomposition of N_2O_5 in the reaction, $2 N_2O_5(g) \rightarrow 4 NO_2(g) + O_2(g)$ is $k = 3.38 \times 10^{-5} \text{ s}^{-1}$ at 25°C . Calculate, (a) the half-life of N_2O_5 ; (b) α (fraction decomposed) and reaction time, t if $P_0 = 500 \text{ Torr}$, $P_{total} = 520 \text{ torr}$. (20%)
- The activation energy of one of the reactions in the Krebs citric acid cycle is 87 kJ mol^{-1} with a rate constant of $1.15 \times 10^{-3} \text{ h mol}^{-1} \text{ s}^{-1}$ at 37°C . What is the rate constant when temperature falls to 15°C ? (15%)

Note: The atomic weight: $H = 1.008$, $C = 12.01$, $O = 16.00$.