

國立臺北科技大學九十七學年度碩士班招生考試

系所組別：3711 有機高分子研究所甲組

第二節 分析化學 (選考) 試題

填准考證號碼

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第一頁 共一頁

注意事項：

1. 本試題共 6 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. Calculate the absolute standard deviation of the following calculations. Round each result to include only significant figures. The numbers in parentheses are absolute standard deviations. (20 points, 5 points each)
(a) $y = -1.02(\pm 0.02) \times 10^{-7} - 3.54(\pm 0.2) \times 10^{-8} = -1.374 \times 10^{-7}$
(b) $y = 100(\pm 1) \div 2(\pm 1) = 50$
(c) $y = \log[2.00(\pm 0.03) \times 10^{-4}] = -3.69897$
(d) $y = [4.73(\pm 0.03)]^3 = 105.8238$
2. Calculate the electrode potential of a silver electrode immersed in a 0.0500M solution of NaCl using $E_{Ag^+}^0 = 0.799V$. ($K_{sp}(AgCl) = 1.82 \times 10^{-5}$) (10 points)
3. Find the hydronium ion concentration of a 0.0100M NaH_2PO_4 solution. ($K_{a1}(H_2PO_4^-) = 7.11 \times 10^{-3}$, $K_{a2}(H_2PO_4^-) = 6.32 \times 10^{-8}$, $K_w = 1.00 \times 10^{-14}$) (10 points)
4. Calculate the ratio of sodium atoms in the 3p excited states to the number in the ground state at 2500K. (average wavelength of 589.3nm for sodium emission lines, $k = 1.38 \times 10^{-23} JK^{-1}$, $h = 6.626 \times 10^{-34} Js$) (10 points)
5. The ion-accelerating voltage in a particular quadrupole mass spectrometer is 5.00V. How long will it take a singly charged cyclohexane ion to travel the 15.0cm length of the rod assembly? Assume that the initial velocity of the ion in the z direction is zero. (cyclohexane C_6H_{12} , $e = 1.6 \times 10^{-19} C$) (10 points)

6. Define (40 points, 5 points each)
(a) magic angle spinning
(b) attenuated total reflectance in IR
(c) electron-capture detector
(d) gradient elution
(e) scanning tunneling microscope
(f) secondary electrons in SEM
(g) Bragg's Law
(h) pyroelectric transducer in IR