

東海大學 104 學年度碩士班招生考試試題

考試科目：分析化學

應考系組：化學系化學組、化學系化生組 科目代碼：22022

考試日期：104 年 03 月 08 日 第 2 節 使用計算機：可

共 / 頁，第 / 頁

Answer the following questions (Both your knowledge and writing skill will be graded)

1. What is the difference between a homogeneous material and a heterogeneous material? (10%)

2. Write each answer with the correct number of digits. (10%)

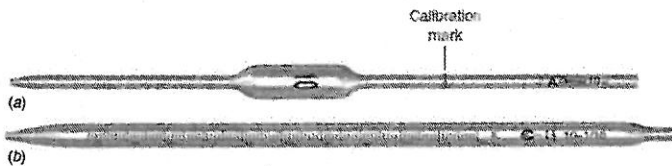
(a) $1.021 + 2.69 = 3.711$

(b) $12.3 - 1.63 = 10.67$

(c) $4.34 \times 9.2 = 39.928$

(d) $0.0602 \div (2.113 \times 10^4) = 2.84903 \times 10^{-6}$

3. Give the **name** for following pipets. Which is more accurate?? (10%)



4. A solution contains 0.0500 M Ca^{2+} and 0.0300 M Ag^+ . Can 99% of Ca^{2+} be precipitated by sulfate without precipitating Ag^+ ? What will be the concentration of Ca^{2+} when Ag_2SO_4 begins to precipitate? For CaSO_4 , $K_{sp} = 2.4 \times 10^{-5}$. For Ag_2SO_4 , $K_{sp} = 1.5 \times 10^{-5}$. (10%)

5. Which statements are true? In the ionic strength range 0–0.1 M, activity coefficients decrease with (a) increasing ionic strength; (b) increasing ionic charge; (c) decreasing hydrated radius. (10%)

6. Write a mass balance for a solution of $\text{Fe}_2(\text{SO}_4)_3$ if the species are Fe^{3+} , $\text{Fe}(\text{OH})^{2+}$, $\text{Fe}(\text{OH})_2^+$, $\text{Fe}_2(\text{OH})_2^{4+}$, FeSO_4^+ , and HSO_4^- . (10%)

7. Calculate how many milliliters of 0.626 M KOH should be added to 5.00 g of 4-(N-Morpholino) butanesulfonic acid (Mw. 233.29, pKa: 7.48) to give a pH of 7.40. (20%)

8. A 0.0450 M solution of benzoic acid has a pH of 2.78. Calculate pKa for this acid. (20%)