

淡江大學 107 學年度碩士班招生考試試題

系別：化學學系

科目：普通化學

28-1

考試日期：3 月 11 日(星期日) 第 2 節

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1. Write formula for the following compounds. (20%)
(a) Ozone (b) Sodium hydride (c) Sodium carbonate (d) Hydrogen peroxide
2. For $\text{CaCO}_3(s) \rightleftharpoons \text{CaO}(s) + \text{CO}_2(g)$, $K_p = 1.16$ at 800°C . If a 10 g sample of CaCO_3 is put into a 5 L container and heated to 800°C , what percentage by mass of the CaCO_3 will react to reach equilibrium? ($\text{CaCO}_3 = 100$) (10%)
3. Draw the Lewis structures of SO_4^{2-} , including resonance forms. Assign the formal charge to each central sulfur atom. (10%)
4. Using an molecular orbital (MO) energy-level diagram, would you expect O_2 to have a lower or higher first ionization energy than atomic oxygen? Why? (10%)
5. Consider the titration of 50 mL of 0.1 M acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$, $K_a = 1.8 \times 10^{-5}$) by 0.1 M NaOH. Calculate the pH of the resulting solution after the following volumes of NaOH have been added.
(a) 10 mL (b) 25 mL (c) 50 mL (d) 60 mL (40%)
6. Draw all the structural and geometric (cis-trans) isomers of $\text{C}_3\text{H}_5\text{Cl}$. (10%)