

淡江大學 108 學年度日間部轉學生招生考試試題

系別：化學學系、尖端材料學程二年級

科目：普通化學

12-1

考試日期：7月24日(星期三) 第2節

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1. Answer the following questions. (30%)

- Name the following compounds in English: N_2O_5 , $\text{Na}_2\text{S}_2\text{O}_3$
- Write the molecular geometry of SOCl_2 and the hybrid orbital of the central atom.
- Draw the Lewis structure for O_3 and calculate the formal charges of the three oxygen atoms.
- Write the respective element symbols for atoms with atomic numbers of 3, 12, 15, 17, and 30.
- Give an example to explain the physical meaning of the angular momentum quantum number of an atomic electron.
- Write the Arrhenius equation to correlate the rate constant k and the activation energy E_a of a chemical reaction. Define the other terms in the equation.

2. Write the molecular formulas for the following two sets of compounds. Arrange and explain their respective orders of the boiling points. (20%)

- The hydrides of the first four atoms in Group 4A.
- The hydrides of the first four atoms in Group 6A.

3. In a 0.50 M HA aqueous solution, HA is a monoprotic weak acid and is 2.0 % dissociated. (20%)

- Calculate the pH of the weak acid solution.
- Calculate the base dissociation constant K_b for the conjugate base A^- .
- Calculate the pH at the half-neutralization point for the titration of HA with 0.1 M NaOH.

4. Ag_3AsO_4 is a sparingly soluble salt in water. Its solubility product is 6.0×10^{-23} . (15%)

- Write the dissociation reaction of the salt Ag_3AsO_4 .
- Calculate the solubility of Ag_3AsO_4 .
- Predict and explain the change of solubility in (a) if 0.0500 M KNO_3 is added.

5. (a) According to the change of oxidation states (or numbers) between reactants and products, balance the following redox reaction,



- Knowing that the reaction in (a) proceeds to the left spontaneously, indicate the strongest reductant and the strongest oxidant in the redox reaction. (6%)