

系所組別：口腔醫學研究所丙組

考試科目：普通化學

考試日期：0223，節次：3

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. A student has determined the mass-to-charge ratio for an electron to be 5.64×10^{-12} kg/C. In another experiment, using Millikan's oil-drop apparatus, he found the charge on the electron to be 1.605×10^{-19} C. What would be the mass of the electron, according to these data? (10%)
2. Oxalic acid is a toxic substance used by laundries to remove rust stains. Its composition is 26.7% C, 2.2% H, and 71.1% O (by mass), and its molecular weight is 90 amu. What is its molecular formula? (10%)
3. Explain why some electrolyte solutions are strongly conducting, whereas others are weakly conducting. (10%)
4. A sample of nitrogen gas at 18°C and 760 mm Hg has a volume of 2.67 mL. What is the volume at 0°C and 1 atm of pressure? (10%)
5. Which of the following particles has the longest wavelength? (a). an electron traveling at x meters per second. (b). a proton traveling at x meters per second. (c) a proton traveling at $2x$ per second. (10%)
6. Write the complete ground-state electron configuration of the strontium atom, Sr, using the building-up principles. (Sr atomic number: 38) (10%)
7. Use Lewis symbols to show the reaction of atoms to form hydrogen sulfide, Indicate which electron pairs in the Lewis formula of H_2S bonding, and which are lone pairs. (atomic number: H=1, S=16) (10%)
8. If you place room temperature water in a well-insulated cup and allow some of the water to evaporate, the temperature of the water in the cup will drop lower than room temperature. Come up with explanation for the observation. (10%)
9. The composition of the hull of a submarine is mostly iron. Pieces of zinc are placed in contact with the hull throughout the inside of the submarine. Why is this done? (10%)
10. Describe and explain the Haber process. (10%)