請注意:考題中若涉及計算，請將演算過程列出，否則不予計分。

1. Distinguish between
   (a) precision and accuracy. (5%)
   (b) the equivalent point and the end point of a titration. (5%)
   (c) the density and the specific gravity of a solution. (5%)
   (d) a galvanic cell and an electrolytic cell. (5%)

2. What will be the pH of a 1.00×10^{-3} N NaOH solution at 0°C? (Kw at 0°C is 1.00×10^{-15}) (5%)

3. Suggest a method for the determination of the concentration of H_3PO_4 and NaH_2PO_4 in an aqueous solution. (For H_3PO_4; $pKa_1=2.1$, $pKa_2=7.2$, $pKa_3=12.3$) (10%)

4. According to Beer's law, absorbance is linearly related to the concentration of the absorbing species and the path length of the radiation in the absorbing medium. Identify factors that cause the Beer's law relationship to depart from linearity. (10%)

5. A compound had a molar absorptivity of 2.00×10^3 L·cm^{-1}·mol^{-1}. What concentration of the compound would be required to produce a solution having a transmittance of 10.0% in a 5 cm cell? (5%)

6. Define the following terms for atomic absorption spectroscopy (AAS).
   (a) atomization (5%)
   (b) hollow-cathode lamp (5%)
   (c) drying step (for graphite AAS) (5%)
   (d) charring step (for graphite AAS) (5%)

7. Use activities to calculate the electrode potential of a hydrogen electrode in which the electrolyte is 0.01M HCl and the activity of H_2 is 1.00 atm. (5%)
   Why is it necessary to bubble hydrogen (H_2) through the electrolyte in a hydrogen electrode? (5%)

8. Why do glass pH electrodes tend to indicate a pH lower than the actual pH in strongly basic solution? (5%)
   In strong acid, the measured pH is higher than the actual pH. Why? (5%)

9. A solute with a partition coefficient of 4.0 is extracted from 10 mL of phase1 into phase 2.
   (a) What volume of phase 2 is needed to extract 99% of the solute in one extraction? (5%)
   (b) What is the total volume of phase 2 needed to remove 99% of the solute in two equal extractions instead? (5%)

試題隨卷繳回