1. 1. a. $y = \log [(2.00 \pm 0.01) \times 10^{-2}] = ?$
   b. $y = 5\,\pi(3.12 \pm 0.03)^3 = ?$　　20%

2. A solution contains 0.0400 M Ca^{2+} and 0.0300 M Ag^{+}. Can 99.00% of either ion be precipitated by addition of sulfate without precipitating the other metal ion? What will be the concentration of Ca^{2+} when Ag_2SO_4 begins to precipitate? $K_{sp}(Ag_2SO_4)=1.5\times10^{-5}$, $K_{sp}(CaSO_4)=2.4\times10^{-5}$.　　20%

3. A solution containing 3.47 mM X (analyte) and 1.72 mM S (standard) gave peak areas of 3473 and 10222, respectively, in a chromatographic analysis. Then 1.00 mL of 8.47 mM S was added to 5.00 mL of unknown X, and the mixture was diluted to 10.0 mL. This solution gave peak areas of 5428 and 4431 for X and S, respectively.
   (a) Calculate the response factor for the analyte.
   (b) Find the concentration of S (mM) in the 10.0 mL of mixed solution.
   (c) Find the concentration of X (mM) in the 10.0 mL of mixed solution.
   (d) Find the concentration of X in the original unknown.　20%

4. A lead-containing sample of 6.450 g is diluted to 100 ml. A portion of this solution is aspirated into a C_2H_2/air flame for absorbance measurement, and an absorbance value of 0.125 is found using the 283.31 nm Pb line from a hollow cathode lamp. Next, 0.100 ml of a standard solution containing 55.0 μg of Pb per ml is added to 50 ml of the sample solution. When this new sample solution is aspirated into the flame, the absorbance is found to be 0.180. (Pb=207.2 g/mol)
   (a)Calculate the Pb content of the material in ppm (parts per million).
   (b)Briefly describe how the emission line of Pb gives out from a hollow cathode lamp.　20%

5. (a). The voltage for the following cell is 0.503 V at room temperature. Find K_a for the acetic acid.
   Pt(s) | H_2 (1.00 bar) | CH_3COOH (0.050 M), CH_3COONa (0.0050 M) | | Cl^-(1.0 M) | AgCl(s) | Ag(s),　given $E^o(AgCl/Ag)=0.222$ V.
   (b). Find formation constant for the complex $Ag(S_2O_3)_2^{3-}$, given $E^o(Ag(S_2O_3)_2^{3-}/Ag)=0.017$ V and $K_{sp}(AgCl)=1.82\times10^{-10}$.　20%

試題隨卷繳回