

1. 分析水中的 BOD 濃度，經常需要進行不同倍數的稀釋，如何決定那一稀釋倍數正確？(10%)
2. 敘述「分光光度計」(spectrophotometer)的測定原理。(10%)
3. 濃度 mg/l 與 meg/l 如何互換？(5%)
4. 論影響水中 pH 有那些可能的化學或生物的作用？(15%)
5. Metal-plating-industry cyanide wastes are often treated with chlorine at high pH. Two steps are involved: (a) oxidation of CN^- to CNO^- and (b) oxidation of CNO^- to N_2 and CO_2 .
 - (1) Write balanced reactions for each step, assuming that OCl^- is the oxidant and that Cl^- is the product. (10%)
 - (2) How much chlorine, moles of OCl^- consumed per mole of CN^- , is required for each step? (4%)
6. Calculate the pH of a cloud drop in equilibrium with air containing naturally occurring acidic gases: 351 ppm CO_2 and 0.1 ppb formic acid (HCOOH). Ignore activity coefficient corrections. Assume 25°C , 1 atm. Henry's Law coefficient for CO_2 is $10^{-1.47} \text{ M atm}^{-1}$; for HCOOH is $10^{3.57} \text{ M atm}^{-1}$. For H_2CO_3 , $\text{pK}_{a1} = 6.35$, $\text{pK}_{a2} = 10.33$; for HCOOH , $\text{pK}_{a1} = 3.74$. (12%)
7. Explain the following:
 - (1) Define pE. (3%)
 - (2) A sample from a lake gave a pE = 10.5. Does the lake favor oxidation? (2%)
 - (3) What is the implication of pE-pH? (3%)
8. Describe the molecular characteristics of CH_4 and CO_2 that makes them able to absorb infrared radiation (8%)
9. Draw out the chemical structure of following compounds: (10%)
 - (1) 2,4,5-trichlorophenoxyacetic acid (2,4,5-T)
 - (2) Benzo[a]pyrene
 - (3) Bisphenol A
 - (4) BTEX
10. In Atmospheric Chemistry, hydroxyl radical (HO^\cdot) is an important intermediate. Describe how HO^\cdot is produced (8%)

試題隨卷繳回