1. 何謂鹼度(alkalinity)？鹼度對於水中酸鹼值的緩衝有什麼影響？(10%)

2. 何謂鹽度(salinity)？鹽度過高對於水中生物有何影響？(10%)

3. 解釋分光光度計(spectrophotometers)在環境化學分析的原理。(10%)

4. The bioconcentration factor (BCF) for a substance in a particular aquatic species (not just its fat tissues) can be estimated as the K_{ow} value for the substance times the fraction of body fat in the species of interest. Rainbow trout, which average 5.0% body fat, taken from a particular lake was found to contain 32 ppb in their tissue. What is the concentration of parathion (K_{ow} = 6300) in the lake? (5%)

5. Using a logarithmic concentration diagram (pC-pH), determine the pH of a solution containing: (12%)
   (1) 10^{-3} M H_2CO_3 ?
   (2) 10^{-3} M $NaHCO_3$?
   (3) 10^{-3} M Na_2CO_3 ?
   Assume it is a close system; pK_{a1} = 6.3 and pK_{a2} = 10.3

6. A solution contains 50 ppm $C_6H_{15}O_6N$. Assume such organic compound can be completely degraded by bacteria. (Atomic weight: C=12; H=1; O=16; N=14)
   Calculate the theoretical values of following: (12%)
   (1) COD?
   (2) Ultimate carbonaceous BOD?
   (3) Nitrogenous BOD?

7. Deduce the two possible combinations of polychlorophenol molecules that, when coupled together through loss of two HCl molecules, would produce a molecule of 1,2, 7,8-tetrachlorodibenzo-*p*-dioxin (1,2,7,8-TCDD)? (8%)

8. Given O_3 in the atmosphere, (15%)
   (1) Describe chemical reactions for O_3 destruction?
   (2) Describe the importance of O_3 to the environment?

9. Calculate the pH of rainwater in equilibrium with SO_2 in a polluted air mass for which the sulfur dioxide concentration is 2.35 ppm. For SO_2, the Henry's law constant K_H = 1.0 M atm^{-1} at 25°C. The K_a for H_2SO_3 is 1.7×10^{-2}. (10%)

10. Write equations showing the reaction by which atmospheric carbon monoxide is oxidized to carbon dioxide. (8%)

試題隨卷繳回