

※ 注意：請依序將各題答案寫在答案卷上，並標上題號。

1. What could be inferred from the following analytical results concerning the biodegradability of each waste? (8%)

Waste	mg/l	
	5-day BOD	COD
A	70	560
B	450	480
C	75	160

2. Name three instruments you may use in the determination of water pollution. Briefly describe the purpose and fundamental principle of each measurement. (15%)
3. Name three principal cations causing hardness in water, and explain the meanings of hardness in the general public and industry water use. (6%)
4. Would you expect to find the highest concentration of each of the following in raw domestic wastewater or in the effluent from an aerobic biological wastewater treatment plant? Why? (a) $\text{NH}_3\text{-N}$, (b) Organic-N, (c) $\text{NO}_3\text{-N}$. (9%)
5. Approximately what are the pH of a 0.01 N HCl solution and a 0.08N NaOH solution, respectively? (6%)
6. A sample of 100 ml required 10.6 ml N/50 H_2SO_4 to reach the phenolphthalein end point, and a total of 30.4 ml to reach the methyl orange end point. Calculate the phenolphthalein alkalinity and total alkalinity (as mg/l CaCO_3). (6%)
7. Briefly describe the mechanism of the catalytic converters installed in vehicles. Why dual catalyst system is used instead of single catalyst system? (10%)
8. What is the meaning of "first-order reaction"? Why most of the chemical reactions in the environment are described by first-order reaction? (10%)
9. Give an example to describe the role of "Nearst Equation" in oxidation-reduction reactions. (10%)
10. What are the major sources of PCB and Dioxin in the environment? What is the major difference between the environmental distribution and behavior of PCB and Dioxin? (10%)
11. Recently, some uses of plastic bags are banned by Taiwan's EPA due to plastic's limited degradability in the environment. Why plastics are not easily degraded in the environment? Is there any way to improve plastic's degradability? (10%)