

1. Lake Water Quality (12%)
  - (1) Define cultural eutrophication. (3%)
  - (2) Explain how human activities can contribute to lake eutrophication. (3%)
  - (3) List three water quality parameters that can be used to determine a water body's trophic state. (6%)
2. Drinking Water Treatment (12%)
  - (1) Explain the treatment processes commonly used for water purification. (6%)
  - (2) List the advantages and disadvantages of using chlorine or ozone in drinking water treatment. (6%)
3. Sewage Treatment (12%)
  - A. Introduce the main purpose of secondary treatment of wastewater. (5%)
  - B. State the benefits of sending sludge from secondary treatment to a sludge digester in a typical sewage treatment plant. (5%)
  - C. What is the major health concern that limits the use of digested sludge as a soil amendment? (2%)
4. Air Quality Parameters (13%)
  - A. Explain the differences between primary and secondary air pollutants, and state the corresponding control methods. (5%)
  - B. List three air pollutants that influence the pH of water in the atmosphere. (3%)
  - C. Sketch the variations of  $O_3$ ,  $NO$ , and  $NO_2$  mole fractions for a day (0-24 h) in high-traffic areas having photochemical smog. (5%)
5. Air Pollutant Control (21%)
  - A. Introduce the mechanisms of three control devices for capturing particulate air pollutants generated from typical waste incinerators. (9%)
  - B. Define volatile organic compounds (VOCs), and state at least three treatment technologies for gaseous VOC removal. (12%)
6. Waste Management (10%)
  - A. What are the merits of separating food waste from other general waste? (4%)
  - B. State the appropriate ways to dispose of unused or expired medicines. (6%)
7. Hazardous Waste (20%)
  - A. Define pollution control site and pollution remediation site. (5%)
  - B. Introduce three *ex situ* remediation methods for soils contaminated with metals or pesticides. (9%)
  - C. State the goals and applications of solidification and stabilization, and also explain the distinctions between the two processes. (6%)