(一) (18%) To calculate out the COD (mg/L as O_2) and the TOC (mg/L as C) and the COD/TOC ratio from the mass concentration of 1000 mg/L of following compounds, respectively.

(1) Methanol CH_3OH

(2) Glucose $C_6H_{12}O_6$

(3) Formic acid HCOOH

(二) (16%) To write out four molecular formula of nitrogen (N) components and four sulfur (S) components and their inorganic valence number (for example, -2 to +6) that presented in aqueous solution.

(1) Nitrogen (N)

(2) Sulfur (S)

(三) (8%) (1) To explain the reaction mechanism of sunshine photocatalytic ozonation of the uncombusted gasoline (hydrocarbon).

(2)What major products of the photocatalytic ozonation will be formed and the aerosol will turn to be fog or smog.

(四) (8%) To define the terms of pollutant source with full name and their chemical structure.

(1) PCB

(2) Dioxin

(背面仍有題目,請繼續作答)

(五)解釋名詞：每題3分(15%)　環境微生物學部份

1. Xenobiotic compound
2. co-metabolism
3. di-auxic growth
4. AMES test
5. microbial indicator

(二)問答題：每題7分(35%)

1. 以圖示自然界之碳、氮循環，並列出各生化反應名稱及參與反應之微生物名稱。
2. 何謂光自營(photo-autotrophic)、化學自營(chemo-autotrophic)及化學異營(chemo-heterophic)微生物？說明其利用C, N及能量之異同處，並各舉一代表菌屬及其在環境中所扮演之角色。
3. 何謂微生物生長？微生物在密閉系統中有其一定之生長模式，繪圖說明。並列舉三種常用常用來表示微生物活性之測定方法，要述之。
4. 以圖示詳細說明光合作用(photosynthesis)與呼吸作用(respiration)之完整流程及所需條件。
5. 比較好氧(aerobic)與厭氧(anaerobic)生物處理污水之處理程序及主要微生物菌種與生化反應之差異。