

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Describe and giving examples for the following interactions between two toxicants: synergism, antagonism, and potentiation. (6%)
2. Describe how pH values affect the partitioning of salicylic acid across the gastric mucosa and influence the salicylic acid's absorption in gastrointestinal tract. (5%)
3. Define the following two related terms, "ADI" and "TDI". What is the major difference between them? Draw a flowchart to describe how the ADI/TDI can be obtained. (6%)
4. Tabulate the types of phase II reactions, as well as their responsible enzymes, in the biotransformation of the xenobiotics, benzene. Also discuss why (1) they result in better efficiency in urinary excretion of xenobiotics; (2) the biotransformation is considered as a balance between bioactivation and detoxification. (8%)
5. Environmental particulate matters with aerodynamic diameter less than $2.5 \mu\text{m}$ (PM_{2.5}) are attracting more and more attention with respect to their potential impact on human health. Please describe the potential mechanisms responsible for their effects on human cardiopulmonary system. (15%)
6. Please explain the following terms (10%)
 - a). MHC, major histocompatibility complex
 - b). Acquired immunity
7. 過量自由基導致的氧化性壓力已被證實與癌症的產生有關，然而額外的抗氧化物質的添加有時卻無法扮演保護動物不罹患癌症的功能，試說明其可能原因。(8%)
8. 人類的癌症有 35%來自飲食，就您所知，請細數飲食中有那些因子會致癌？那些會抗癌？(8%)
9. 環境污染物若被發現俱有致癌特性往往會受到特別關注。請說明化學致癌物質誘發腫瘤產生的步驟及可能的機制。(9%)
10. 請舉例說明兩種有毒物質所造成的災難。(5%)
11. 說明人體的腎臟構造及功能，並說明有毒重金屬所造成的腎臟傷害。(10%)
12. 討論乾淨水質對健康的重要性，並說明砷污染水源可能造成的危害。(10%)