

1. Describe cytochrome P450 oxidation cycle and its function in detoxification process. (7%)
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. (9%)
3. Tabulate the types of phase II reactions, as well as their responsible enzymes, in the biotransformation of the xenobiotics, benzene. 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. (9%)
4. Exposure to heavy metals can result in primary target damage, target organ injury, and death to organism. Please show the toxicity of toxic heavy metal mercury. (10%)
5. Define dose-response relationship and selectivity. (10%)
6. Define poisons and describe several functions for poisons. (5%)
7. Define the following terms: (15%)
 - a. Acceptable Daily Intake (ADI)
 - b. Transversion, transition and frameshift mutation
 - c. Tumor promotion
 - d. MTD
 - e. Ames test
8. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is a highly persistent trace environmental contaminant and is one of the most potent toxicants known to man. TCDD induces a variety of biological responses, including induction of cytochrome P-450 1A, to reproductive and developmental defects, immunotoxicity, liver damage, wasting syndrome and cancer. Although a great deal is known about TCDD-related biological consequence, much less is known about the mechanisms by which TCDD causes toxicity and disease. Please explain as much as possible the mechanisms of TCDD-induced toxicity. (10%)
9. 吸入的空氣微粒如 PM2.5，會對肺部產生什麼影響？ (10%)
10. 解釋名詞 (15%)
 - a). Epitope
 - b). TGF-beta
 - c). Chemokines