

※ 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. Define poisons and describe several functions for poisons (10%). Define dose-response relationship. (5%)
2. Toxicology attempts to define the harm that toxicants can cause damages to human beings and it is an integral part of the risk assessment process. Please show a toxicological approach to toxicant(s) in high-tech industry. (10%)
3. The main function of a hypothesis is to suggest new experiments or new observations. Most experiments and many observations are carried out with the deliberate object of testing a hypothesis. Please show an approach to the study of mercury toxicity. (13%)
4. Give two examples happened recently in our society related to toxicants and their impacts. (12%)
5. Compare phase I and phase II reactions with respect to: (a) location of the reactions (b) structure change during the processes (c) polarity and water solubility. (9%)
6. What are the objectives of subchronic toxicology studies? What benefits the in vitro toxicity testing system can provide? (8%)
7. Oxidative stress has become an important research topic in the field of toxicology, give five examples of reactive oxygen species (ROS) or reactive nitrogen species (RNS). (8%)
8. Describe the role of  $Fe^{2+}/Fe^{3+}$  in the cytochrome P450 oxidation cycle for the detoxification process. (2%)
9. Try your best to describe what WHO/IARC reported in the late October, 2015, on the carcinogenicity of the consumption of red meat and processed meat. (5%)
10. 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%)
11. Define the following two terms, "ADI", "TDI", and "MRL". Draw a diagram to describe how the ADI, TDI, and MRL can be determined. Use the diagram to explain why an MRL value for ractopamine is set to be 0.01ppb and why this value is considered safe for consumers. (10%)