編號： 321 **國立成功大學106學年度碩士班招生考試試題**

系　　所：環境醫學研究所

考試科目：毒理學　　考試日期：0214，節次：2

※ 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. What is a poison? (4%) What is toxicology? (4%)
2. Explain dose-response relationship and selectivity. (8%)
3. Describe absorption, distribution, metabolism, and excretion of a toxicant in the human body. (9%)
4. Try your best to define NOAEL and give an example to explain how the value of NOAEL can be determined in a toxicity test. Describe the various models for estimating the risk of toxicant exposure at low doses below NOAEL and discuss their advantages and disadvantages. (9%)
5. Use the fact, pKa (salicylic acid) = 2.97, to describe how pH values affect the partitioning of salicylic acid across the gastric mucosa and influence the salicylic acid's absorption in gastrointestinal tract. (8%)
6. An abandoned pentachlorobenzene (PCP) manufacturing plant is highly contaminated with residual PCP in the An-Shun area of Tainan. Assuming you are invited by the Tainan city government to provide your expert opinion on setting an environmental exposure guideline for fish ingestion of PCP, please (1) draw a flowchart to describe how the PCP concentration limit of fish being sold in the market can be developed; and (2) use the following information to calculate the value of PCP concentration limit of fish. (i) Average body weight of the city resident: 60 kg; (ii) 5^{th}, 50^{th}, and 95^{th}, percentile fish consumption rate: 5.3, 20.1, and 63 g/day for the residents of Tainan; (iii) LD_{50} for PCP in rats: 150 mg/kg/day; (iv) NOAEL for PCP in rats: 30 mg/kg/day; (v) Tolerable Daily Intake (TDI) for PCP: 0.03 mg/kg/day; (vi) Minimal risk level (MRL) from Agency for Toxic Substances and Disease Registry (ATSDR) for PCP in human: 0.005 (acute) & 0.001 (chronic) mg/kg/day; (vii) Average weight of the fish in the market: 600 g; (viii) Uncertainty factor: 1000; (ix) The mayor promises the safety guideline will protect top 5 percent of heavy fish consumers. (8%)
7. Describe as much as possible how a normal cell becoming transformed cancerous cell when exposed to hormone-like environmental chemicals. (8%)
8. What benefits the in vitro toxicity testing system can provide? What are the objectives of subacute toxicology studies? (8%)
9. Explain the following terms and their toxicological significance: (9%)
   a. Oxidative stress.　b. LD50，ED50，MTD. c. DNA adduct.
10. Explain the following terms: (15%)
    a. T-regulatory cells b. Dendritic cells c. Cytotoxic T cells
11. Identify the acute health effects incurred after exposure to high level of urban PM2.5 (>71 $\mu g/m^3$). (10%)