

國 立 清 華 大 學 命 題 紙

95 學年度 醫學工程與環境科學 系 (所) 乙(環境分子科學) 組碩士班入學考試

科目 環境科學與工程 科目代碼 3102 共 1 頁第 1 頁 \*請在【答案卷】內作答

Environmental Science and Engineering

Entrance examination, 95.3.11

1. Waste management includes treatment, storage and disposal, etc., please explain their definition and compare their differences with each other. (10 %)
2. Draw a figure and describe the basic components of a fuel cell system including a reformer, fuel cell, and external electrical load. (10 %)
3. Draw and explain a diagram of nuclear fuel cycle reprocessing for nuclear reactor. (10 %)
4. Draw a figure and explain the dose-response curves for carcinogen (stochastic effect) and non-carcinogen (deterministic effect). (10 %)
5. Draw a figure and describe how to use three wells to determine the hydraulic gradient. (10 %)
6. Explain the definition and their relationship of distribution coefficient ( $K_d$ ) and retardation factor ( $R_f$ ). (10 %)
7. Draw two figures and explain sub-/super- adiabatic ambient lapse rate. Which is stable and which is unstable? Give your reason. (10 %)
8. Why ozone hole occurred in the stratosphere over the Antarctic rather than over the Arctic. (10 %)
9. Describe the principle of composting and the composting process. (10 %)
10. Human exposure to radiation is often measured in Sv (sievert), or mSv (milli-sievert). The cancer risk caused by exposure to radiation is thought to be approximately 1 fatal cancer per 80 person-Sv of exposure (e.g., 1 cancer death if 8,000 people are exposed to 10 mSv each, or 10,000 people to 8 mSv each, etc.). (1) Natural radioactivity in the environment is thought to expose us to roughly 2.0 mSv/y. How many cancer deaths in Taiwan (population 23 million) would be expected per year from this exposure ? (2) A single Taipei-Tokyo jet flight exposes an individual to about 0.02 mSv. How many flights would be required to elevate your cancer risk by one in 1 million ? (10 %)