

八十五學年度 原子科學 系(所) 乙 組碩士班研究生入學考試
科目 環境科學 科號 4104 共 2 頁第 1 頁 *請在試卷【答案卷】內作答

1. Define or explain the following terms: (40%)
 - (1) pollution and contamination
 - (2) decontamination factor and volume reduction ratio
 - (3) treatment and disposal
 - (4) waste management and waste administration
 - (5) waterborne and rodent-borne
 - (6) marsh and swamp
 - (7) earth's albedo and solar constant
 - (8) weather and climate
 - (9) evapotranspiration and transpiration
 - (10) detention time and flow through time
 - (11) radon and thoron
 - (12) coagulation and flocculation
 - (13) free available chlorine and break-point chlorination
 - (14) metalimnion and thermocline
 - (15) replacement-level fertility and population momentum
 - (16) adiabatic lapse rate and temperature inversion
 - (17) autotroph and catabolism
 - (18) phytoplankton and zooplankton
 - (20) high-level radwaste and low-level radwaste

2. In environmental monitoring, how to distinguish the contamination of local facility release from which of worldwide fallout? (15%)

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3. A wastewater is to be treated in a completely stirred tank reactor. Assume an irreversible, first-order reaction $r_A = -\kappa [A]$, which $\kappa = 0.15 \text{d}^{-1}$. Determine the flowrate which can be handled if the reactor volume is 20 m^3 and 98% treatment efficiency required. What volume would be required for the same flowrate if the treatment efficiency need only be 92%? (15%)

4. (a) Draw the growth-death curve for a bacterial culture. Label the axes and all phases of the curve, and briefly explain the diagram.
(b) What comparisons can be made between the growth-death curve of the bacterial culture and a graph showing world human population growth. Can we learn any lessons from this comparison? (15%)

5. In a BOD test, 5 mL of wastewater ($\text{DO}=0$) is mixed with 295 mL of diluting water ($\text{DO}=9 \text{ mg/L}$). After 5 days' incubation of the mixture, $\text{DO}=5.2 \text{ mg/L}$. What is the BOD_5 of the wastewater? (15%)