國立中央大學101學年度碩士班考試入學試題卷

所別：環境工程研究所碩士班 甲組(一般生)　科目：衛生工程　共 1 頁 第 1 頁

本科考試禁用計算器

＊請在試卷答案卷（卡）內作答

1. Explain the followings: (25%)
   (a) Disinfection by-products (DBPs)
   (b) Endocrine disruptor
   (c) Sweep coagulation
   (d) Endogenous decay
   (e) Overflow rate

2. Alum [$Al_2(SO_4)_3 \cdot 18\ H_2O$] is the mostly used coagulant. One problem of using alum is that the consumption of alkalinity. (20%)
   (a) Complete and balance the precipitation of alumina upon the addition of alum.
   (b) Form (a), calculate the required alkalinity per mg/L of alum is added.
   (c) What are other possible problems of using alum as coagulant?

3. Compare the advantages and disadvantages of biofilm (e.g., trickling filter) and activated sludge systems. (15%)

4. Compare the water quality between groundwater and river water and discuss the differences in the potable water treatment processes when using them as source waters. (15%)

5. Analysis of a groundwater sample gives the following: [Ca^{2+}] = 60 mg/L, [Mg^{2+}] = 24 mg/L, [HCO_3^-] = 200 mg/L as $CaCO_3$. Calculate the dosages of lime ($Ca(OH)_2$) and soda ash (Na_2CO_3) (10%)　(Note: only [HCO_3^-] is presented in mg/L as $CaCO_3$)(M.W.: Ca = 40, Mg = 24, Na = 23, O = 16, C = 12).(15%)

6. From the view of sustainable water treatments, mineralization of organic compounds (e.g., BOD, NBOD, and etc) in activated sludge system is considered energy-wasted for some water-reclamation purposes. Why is that? What could be more sustainable ways? (10%)