國立臺灣大學 105 學年度碩士班招生考試試題

※ 注意：全部題目均請作答於試卷內之「非選擇題作答區」，請標明題號依序作答。

1. Based on the sedimentation theory, identify and describe the three types of settling, and give an example of where they are applied in water or wastewater treatment. (10 points)

2. An ideal horizontal-flow sedimentation tank has a depth of 5 m, width of 6 m, length of 45 m, and process flow rate of 650 m^3/h. Assume the following influent particle-settling characteristics:

Particle settling velocity, m/h	Number of particle, #/mL
0.5	567
1	752
2	1126
3	1320
4	872

(a) Estimate the overflow rate. (5 points)
(b) Calculate the overall particle removal efficiency. (10 points)

3. (a) Identify the specific chlorine species present in free chlorine and combined chlorine. (5 points)
(b) Describe the chlorine breakpoint curve and the concept of breakpoint chlorination in the chlorine. (5 points)

4. (a) Sketch a flow diagram and describe all the processes for a secondary wastewater treatment system using the activated sludge method. (10 points)
(b) For water reuse, design an advanced system to improve the water quality of bio-treated effluent from a secondary wastewater treatment plant to meet the drinking water standards. Explain your reason for choosing the above processes. (5 points)

5. Explain the following terms in details:
(a) Combined-sewer overflow (5 points)
(b) Percentage of connection (5 points)
(c) Water scarcity (5 points)
(d) Unaccounted-for water (5 points)

6. A town has an increasing population and its drinking water supply replies on a nearby river. It is expected that the current water supply will not meet the water demand in 10 years. Describe the important considerations that are required to decide whether or not to build a reservoir to meet the future water demand. (10 points)

7. Lead pipe has been banned for its use in drinking water distribution system in Taiwan since 1979. Describe why it was used and the problems in drinking water applications. (10 points)

8. Hydrogen sulfide (H_2S) is a toxic gas that can be present in the sewer system.
(a) Describe the conditions that are favorable for H_2S formation (5 points)
(b) Propose two methods that can be used to control H_2S in the sewer system (5 points)

試題隨卷繳回