Homework #5

Due: June 2, 2018 (Sat), 18:00, by email(ychoi81@snu.ac.kr)

* 아래 문항은 내용을 충분히 이해하고 필요 시 참고문헌을 추가로 찾아 읽어본 이후에 한글로 답하기 바랍니다. 영문으로 된 수업자료 내용을 그대로 제시하면 점수를 부여하지 않고, 한글로 직역하였을 경우에도 상당한 감점을 부과할 것입니다.

1. Describe how the phosphorus (P) removal efficiency could be affected by the competition of the P accumulating organism (PAO) with the glycogen accumulating organism (GAO) in an enhanced biological P removal process. Include the discussion on the potential environmental factors that affects the competition. (20 points)

2. List the types of the operational problems (poor sludge settling) occurring in secondary clarifiers of an activated sludge process. Briefly describe each. (20 points)

3. Select one of the innovative processes for energy recovery from wastewater listed below. Read the reference given for the process of your choice and provide a brief (3-4 paragraph) summary. (30 points)

Process	Reference
Anaerobic Fluidized Membrane Bioreactor	Kim et al. (2011) Anaerobic fluidized bed membrane bioreactor for wastewater treatment. Environmental Science & Technology, 45, 576-581.
Wastewater Heat Pump	Hepbasli et al. (2014) A key review of wastewater source heat pump (WWSHP) systems. Energy Conversion and Management, 88, 700-722. (focus on Chapter 1-3 [pp. 700-705])
Coupled Aerobic–Anoxic Nitrous Decomposition Operation	Scherson et al. (2013) Nitrogen removal with energy recovery through N_2O decomposition. Energy & Environmental Science, 6, 241-248.
Solid-State Anaerobic Digestion	Li et al. (2011) Solid-state anaerobic digestion for methane production from organic waste. Renewable and Sustainable Energy Reviews, 15, 821-826.
Microbial Fuel Cell	Wang et al. (2015) Practical energy harvesting for microbial fuel cells: a review. Environmental Science & Technology, 49, 3267-3277.