

CVEN 5534
Spring 2008

Assignment 1, Due Tuesday, Jan 22

A municipal wastewater treatment plant receives $70 \text{ m}^3/\text{min}$ average flow containing 250 g/m^3 soluble/colloidal organic matter measured as carbonaceous oxygen demand (COD), which has units of g/m^3 oxygen. Approximately 95% of the COD is removed from the treated wastewater. Of the fraction removed, 75% of the COD is oxidized by bacteria to CO_2 and 25% is incorporated into bacterial biomass.

- a. What is the mass flow rate of oxygen (kg/day) that must be supplied?
- b. What is the yearly emission of CO_2 (kg/yr) from the plant. Compare this to the emissions from a 200 MW power plant.
- c. What is the biomass generation rate (kg/year) if the chemical for bacterial cells is $\text{C}_5\text{H}_7\text{NO}_2$?