Sewage disposal

Assignment II

**Problem 5:** The sewage is flowing @ 4.5 MLD from a primary clarifier to a standard rate trickling filter. The 5 day BOD of the influent is 160 mg/l. The value of the adopted organic loading is to be 160 gm/m$^3$/day, and surface loading 2000 l/m$^2$/day. Determine the volume of the filter and its depth. Also calculate the efficiency of this filter unit.

**Problem 6:** Design a sludge digestion tank for 40,000 people. The sludge content per capita per day is 0.068 kg. The moisture of the sludge is 94%. The specific gravity of the wet sludge is 1.02 and 3.5% of the digester volume is daily filled with the fresh sludge, which is mixed with the digested sludge.

**Problem 7:** An average operating data for conventional activated sludge treatment plant is as follows:

i. Wastewater flow = 35000 m$^3$/day
ii. Volume of aeration tank = 10900 m$^3$
iii. Influent BOD = 250 mg/l
iv. Effluent BOD = 20 mg/l
v. Mixes liquor suspended solids (MLSS) = 2500 mg/l
vi. Effluent suspended solids = 30 mg/l
vii. Waste sludge suspended solids = 9700 mg/l
viii. Quantity of waste sludge = 220m$^3$/d

Based on the information above, determine:

a) Aeration period (hrs)
b) Food to microorganism ratio (F/M) ( kg BOD per day/kg MLSS)
c) Percentage efficiency of BOD removal
d) Sludge age (days).

**Problem 8:** Design an oxidation pond for treating sewage from a hot climate residential colony with 5000 persons, contributing sewage @ 120 litres per capita per day. The 5 day BOD of sewage is 300 mg/l.