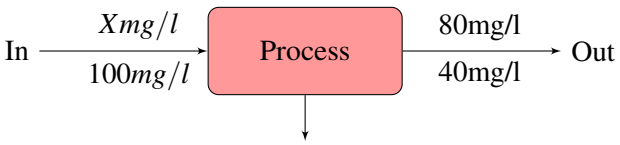
3. Calculate the inlet concentration if the outlet concentration is 80 mg/l and the process removal efficiency is 60%

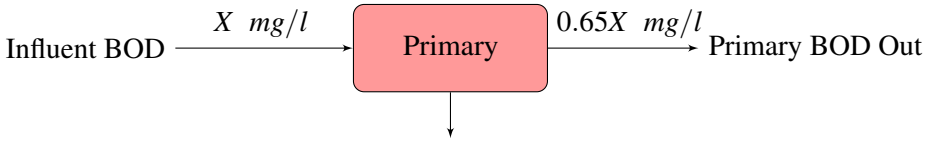


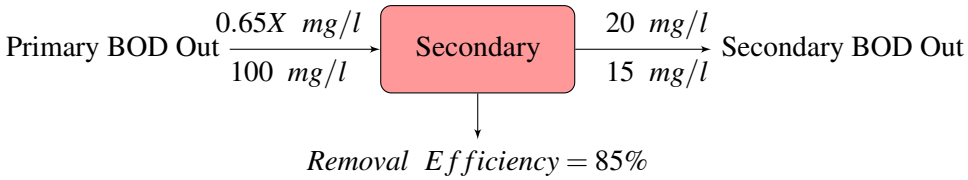
$$\frac{In}{Out} : \frac{Actual\ \ inlet\ \ (X)}{80} = \frac{100}{100-60} \implies \frac{Actual\ \ inlet\ \ (X)}{80} = 2.5$$

Rearranging the equation: $Actual\ \ inlet(X) = 2.5 * 80 = \boxed{200mg/l}$

4. If a plant removes 35% of the influent BOD in the primary treatment and 85% of the remaining BOD in the secondary system, what is the BOD of the raw wastewater if the BOD of the final effluent is 20mg/l

Solution:

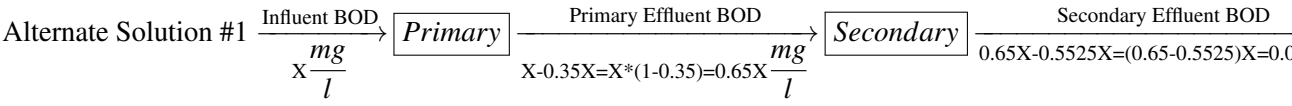




For the Secondary process:

$$\frac{In}{Out} : \frac{0.65X}{20} = \frac{100}{15} \implies X\ \ mg/l = \frac{100 * 20}{15 * 0.65} = \boxed{205\ \ mg/l}$$

Alternate Solution #1

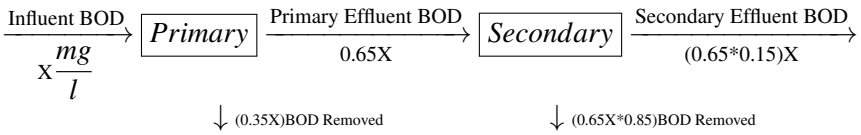


↓ (0.35X)BOD Removed

↓ (0.65*0.85)X = 0.5525X BOD Removed

$$\implies 0.0975X = 20 \implies X = \frac{20}{0.0975} = \boxed{205\frac{mg}{l}}$$

Alternate Solution #2:



Primary Effluent BOD = Influent BOD * (1-Primary BOD Removal), and

Secondary Effluent BOD=[Primary Effluent BOD]*(1-Secondary BOD Removal)