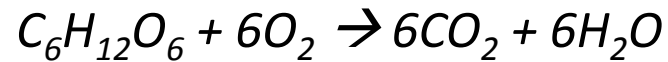


Oxygen demand

Slide#23 solution)

Reaction stoichiometry:



MW of glucose = 180 g/mole

ThOD of 108.75 mg/L glucose

$$108.75 \text{ mg glucose/L} \times \frac{(6 \times 32) \text{ g } O_2/\text{mole glucose}}{180 \text{ g glucose/mole}} = \mathbf{116 \text{ mg } O_2/L}$$

Modeling BOD

Slide#32 solution)

i) Ultimate BOD

$$BOD_t = L_0(1 - e^{-kt})$$

$$L_0 = \frac{BOD_5}{1 - e^{-5d \times k}} = \frac{120 \text{ mg/L}}{1 - e^{-5d \times 0.115 \text{ d}^{-1}}} = 274 \text{ mg/L}$$

ii) BOD₃ at 15°C

$$k_{15} = k_{20} \theta^{15-20}, \theta = 1.135 \text{ at } 4-20^\circ\text{C}$$

$$k_{15} = 0.115 \text{ day}^{-1} \times 1.135^{15-20} = 0.0611 \text{ day}^{-1}$$

$$BOD_3 = 274 \text{ mg/L} \times (1 - e^{-0.0611 \text{ day}^{-1} \times 3 \text{ day}}) = 45.9 \text{ mg/L}$$