Tutorial Sheet-1| UCH301 Material and Energy Balances

Q.1 Convert (a) 10 gal/hr to m^3/sec (b) 22.4 L/gmol to ft^3/lbmol

Q.2 The thermal conductivity of a liquid metal is predicted via the empirical equation

$k = A\exp(B/T)$ *where* $k = J/(s)(m)(K)$

A and B are constants. What are the units of A and B?

Q.3 Consider the equation

D (ft) = 3 t (s) + 4

(a) If equation is valid, what are the dimensions of constant 3 and 4?

(b) If equation is consistent in units, what are the units of 3 and 4?

(c) Derive the equation for distance (D) in meters in terms of time in minutes.

Q.4 Which is faster, 60 miles/hr or 60 ft/s?

Q.5 How much is the weight of 2 liter soda POP in pounds? (Assume soda POP has same density as of water).

Q.6 Express normal body temperature, 98.6 ^{0}F in ^{0}C and K.

Q.7 If y(m/s2) = a z(m^3), what are the units of a?

Q.8 A quantity k depends on temperature in following manner:

k (mol/(cm^3·s)) = 1.2×10^5 exp (-20000/1.987T)

The units of the quantity 20000 are cal/mol and T is in K, what are the units of 1.2×10^5 and 1.987.