T = 30°C = 303 K

\[
\log p_w^* = 29.8605 + \frac{3152.2}{303} - 7.3037 \log(303) \\
+ 2.4292 \times 10^{-9}(303) + 1.809 \times 10^{-6}(303)^2
\]

**Typically Negligible**

\[
\log p_w^* = 31.6 \text{ mm Hg} \quad \text{Vapor Pressure}
\]

\[
p_w = \frac{\text{hr } p_w^*}{100} = \frac{(65)(31.6)}{100} = 20.5 \text{ mm Hg}
\]

[Boxed answer: C]
(2) \[ 2165 \times \frac{0.092 \text{ lb/s}}{16 \text{ s}} \times \frac{453.6 \text{ g}}{16 \text{ g}} \times \frac{\text{mol}}{82 \text{ g}} = 1.018 \text{ mol Q (nQ)} \]

\[ 20' \times 16' \times 9' = 2880 \frac{\text{ft}^3}{\text{m}} \times \frac{1000 \text{ L}}{35.315 \frac{\text{ft}^3}{\text{L}}} = 81552 \text{L} \]

\[ P\text{Y} = nRT \]

\[ \text{AIR: } (1 \text{ atm})(81552 \text{L}) = n(0.08206)(298 \text{K}) \]

\[ n_{\text{AIR}} = 3334.93 \text{ mol} \]

\[ \text{mole fraction: } Y_Q = \frac{n_Q}{n_{\text{AIR}} + n_Q} = \frac{1.018}{3334.93 + 1.018} \]

\[ Y_Q = 0.00031 \]

**Note:** I have assumed that "total" material in gas is AIR plus Q. One could also argue that 1 atm & 81552L was after Q volatilized.

Practice Quiz #1
\[ C_i = \frac{C_{UQ} P^e}{H_i^*} = \frac{C_{UQ} Y_i P}{H_i^*} \]

We don't know what \( P \) & \( C_{UQ} \) are, but they are the same for all 3 gases being compared. So,

\[ C_i \propto \frac{Y_i}{H_i^*} \]

Methane \[ C_m \propto \frac{0.20}{41300} = 4.84 \times 10^{-6} \]

Oxygen \[ C_o \propto \frac{0.30}{48800} = 6.85 \times 10^{-6} \]

Nitrogen \[ C_n \propto \frac{0.50}{86500} = 5.78 \times 10^{-6} \]

Note: If one were comparing the 3 pure gases, methane would be the greatest value of the three gases. Methane would be most soluble.