Catrien Shofiya Amanda (105210105) - Konsep Gas Ideal

⑤ Basis 100 unit volume $CO_2$ 10,5%
$CO$ 1,1%
$O_2$ 7,7%
$N_2$ 80,7%

a) Its composition by weight (Mixal basis = 100 lb mole)

- $CO_2$ (BM = 44,01)
  10,5 lb mole atau 463,05 lb
- $CO$ (BM = 28,01)
  1,1 lb mole atau 30,811 lb
- $O_2$ (BM = 31,99)
  7,7 lb mole atau 246,323 lb
- $N_2$ (BM = 28)
  80,7 lb mole atau 2.259,6 lb

b) The volume occupied by 1,0 lb of the gas at 67°F and 29,1 in of Hg pressure

⇒ • 1 lb of the gas = $\frac{1}{\text{BM gas}} = \frac{1}{132,1}$

= 0,00757 lb mole

• Volume at S.C. = 0,00757 × 359 cu ft

= 2,717 cu ft

• T ⇒ 67°F = (67-32) + 492°R = 35 + 492°R

= 527°R

∴ Volume at 29,1 in Hg, 67°F

⇒ $\frac{P_1 . V_1}{P_2 . V_2} = \frac{T_1}{T_2} \rightarrow V_2 = V_1 . \frac{P_1}{P_2} . \frac{T_2}{T_1}$

$= 2,717 . \frac{29,92}{29,1} . \frac{527°R}{492°R}$

$= \frac{42.841,22}{14.317,2}$

= 2,992 cu ft

c) The density of the gas in pounds per cubic foot (lb/cu ft) at the conditions part (b)

⇒ Density at 29,1 in Hg, 67°F = $\frac{1 \text{ lb}}{2,992 \text{ cuft}}$

= 0,3342 lb/cuft

d) The specific gravity of the mixture

$s.g. = \frac{\text{density gas}}{\text{density air}} = \frac{0,3342 \text{ lb/cu ft}}{0,0807 \text{ lb/cu ft}}$

= 4,1412