C_4H_{10} $10.0\,g \times \frac{1\,mol}{58.14\,g} = 0.172\,mol$

$P = \frac{nRT}{V} = \frac{(0.172\,mol)(0.0821\,\frac{atm \cdot L}{mol \cdot K})(323\,K)}{3.00\,L} = 1.52\,atm$

C_3H_8 $5.00\,g \times \frac{1\,mol}{44.11\,g} = 0.113\,mol$

$P = \frac{nRT}{V} = \frac{(0.113\,mol)(0.0821\,\frac{atm \cdot L}{mol \cdot K})(323\,K)}{3.00\,L} = 0.999\,atm$

$P_T = P_1 + P_2 = 1.52 + 0.999 = 2.52\,atm$

~~$P_A = X_A$~~ $P_A = X_A P_T$

$10.0\,g\ C_4H_{10} \rightarrow 0.172\,mol$
$5.00\,g\ C_3H_8 \rightarrow 0.113\,mol$
$\Big\} 0.285\,mol$

$X_{C_4H_{10}} = \frac{0.172}{0.285} = 0.604$

$X_{C_3H_8} = \frac{0.113}{0.285} = 0.396$

$P_T = \frac{n_T RT}{V} = \frac{(0.285)(0.0821)(323)}{3.00\,L}$

$P_{C_4H_{10}} = (0.604)(2.52\,atm) = 1.52\,atm$

$P_T = 2.52\,atm$

$P_{C_3H_8} = (0.396)(2.52\,atm) = 0.998\,atm$

C_4H_{10} $10.0\,g \times \frac{1\,mol}{58.14\,g} = 0.172\,mol$

$$P = \frac{nRT}{V} = \frac{(0.172\,mol)\left(0.0821\,\frac{atm \cdot L}{mol \cdot K}\right)(323\,K)}{3.00\,L} = 1.52\,atm$$

C_3H_8 $5.00\,g \times \frac{1\,mol}{44.11\,g} = 0.113\,mol$

$$P = \frac{nRT}{V} = \frac{(0.113\,mol)\left(0.0821\,\frac{atm \cdot L}{mol \cdot K}\right)(323\,K)}{3.00\,L} = 0.999\,atm$$

$P_T = P_1 + P_2 = 1.52 + 0.999 = 2.52\,atm$

~~$P_A = X_A P_T$~~ $P_A = X_A P_T$

$10.0\,g\ C_4H_{10} \rightarrow 0.172\,mol$
$5.00\,g\ C_3H_8 \rightarrow 0.113\,mol$
$\Big\} 0.285\,mol$

$X_{C_4H_{10}} = \frac{0.172}{0.285} = 0.604$

$X_{C_3H_8} = \frac{0.113}{0.285} = 0.396$

$$P_T = \frac{n_T RT}{V} = \frac{(0.285)(0.0821)(323)}{3.00\,L}$$

$P_{C_4H_{10}} = (0.604)(2.52\,atm) = 1.52\,atm$

$P_{C_3H_8} = (0.396)(2.52\,atm) = 0.998\,atm$

$P_T = 2.52\,atm$

$d = \frac{\text{mass}}{V}$ $\left[\frac{g}{L}\right]$ $\quad n = \frac{\text{mass}}{M_m}$

$PV = nRT \Rightarrow \frac{P}{RT} = \frac{n}{V} \Rightarrow \frac{P}{RT} = \frac{\text{mass}}{M_m V} \rightarrow d$

$\frac{P}{RT} = \frac{d}{M_m} \Rightarrow \boxed{d = \frac{PM_m}{RT}} \quad \boxed{M_m = \frac{dRT}{P}}$

$d = 0.526\ g/L$
$T = 300\ K$
$P = 1.00\ atm$

$M_m = \frac{dRT}{P} = \frac{(0.526\ g/L)(0.0821\ \frac{atm \cdot L}{mol \cdot K})(300\ K)}{1.00\ atm}$

$M_m = 12.955 \Rightarrow 13.0\ g/mol$ "weighted average" of H_2, CH_4 mix

let X_{H_2} $\quad 1 - X_{H_2} = X_{CH_4}$

moles × M_m = grams...

$M_{m_{H_2}} X_{H_2} + M_{m_{CH_4}} (1 - X_{H_2}) = 13.0\ g/mol$

$(2.02\ g/mol) X_{H_2} + (16.05\ g/mol)(1 - X_{H_2}) = 13.0\ g/mol$

$2.02 X_{H_2} + 16.05 - 16.05 X_{H_2} = 13.0$

$+14.05 X_{H_2} = +3.05$

$\boxed{X_{H_2} = 0.217}$

$\boxed{X_{CH_4} = 1 - 0.217 = 0.783}$

$2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$

1 mol — (4 mol)

C_2H_6 = LR

$1.00\ mol\ C_2H_6 \times \frac{4\ mol\ CO_2}{2\ mol\ C_2H_6} = 2.00\ mol\ CO_2$ produced

$1.00\ C_2H_6 \times \frac{6\ mol\ H_2O}{2\ mol\ C_2H_6} = 3.00\ mol\ H_2O$ produced

@ 400K → gas

$1\ mol\ C_2H_6 \times \frac{7\ mol\ O_2}{2\ mol\ C_2H_6} = 3.50\ mol\ O_2$ consumed

→ $0.50\ mol\ O_2$

$n_{CO_2} = 2.00\ mol \longrightarrow X_{CO_2} = 0.363$

$n_{H_2O} = 3.00\ mol \longrightarrow X_{H_2O} = 0.545$

$n_{O_2} = 0.50\ mol$ / $5.50\ mol \longrightarrow X_{O_2} = 0.090$

$P_T = \frac{n_T RT}{V} = \frac{(5.50\ mol)\left(62.4\ \frac{mmHg \cdot L}{mol \cdot K}\right)(400K)}{50.0L} = 2750\ mmHg$

$P_{CO_2} = X_{CO_2} P_T = (0.363)(2750\ mmHg) = 998\ mmHg$

$P_{H_2O} = X_{H_2O} P_T = (0.545)(2750\ mmHg) = 1.50 \times 10^3\ mmHg$

$P_{O_2} = X_{O_2} P_T = (0.090)(2750\ mmHg) = 248\ mmHg$

$2746 \Rightarrow 2750\ mmHg$