P# G

Ch. 10

$A = .0050\ m^2$
$l = .15\ m$

$T_1 = 363\ K$ $\qquad$ $T_2 = 298\ K$
$P_1 = 1.0 \times 10^5\ Pa$

a) $P_2 = ?$ $\qquad \frac{P_1}{T_1} = \frac{P_2}{T_2}$ (V is constant)

$$\frac{(1.0 \times 10^5\ Pa)}{363\ K} = \frac{P_2}{298\ K}$$

$$\boxed{P_2 = 82{,}000\ Pa}$$

b) $P = \frac{F}{A}$ $\qquad (82{,}094\ Pa) = \frac{F}{.0050\ m^2}$

$$\boxed{F = 410\ N}$$

c) $P_1 = 1.0 \times 10^5\ Pa$ $\qquad$ $P_2 = 1.0 \times 10^5\ Pa$
$T_1 = 363\ K$ $\qquad$ $T_2 = 298\ K$
$V_1 = V_2 = (.0050\ m^2)(.15\ m)$
$= 7.5 \times 10^{-4}\ m^3$

$P \cdot V = n \cdot R \cdot T$ so $n = \frac{P \cdot V}{RT}$

$$n_1 = \frac{P_1 \cdot V}{R \cdot T_1} = \frac{(1.0 \times 10^5\ Pa)(7.5 \times 10^{-4}\ m^3)}{(8.31\ J/mol\,K)(363\ K)} = 1.72\ mol$$

$$n_2 = \frac{P_2 \cdot V_2}{R \cdot T_2} = \frac{(1.0 \times 10^5\ Pa)(7.5 \times 10^{-4}\ m^3)}{(8.31\ J/mol\,K)(298\ K)} = 2.09\ mol$$

$$\boxed{\Delta n = .37\ mol}$$