

College Prep Chemistry of the Earth

Assignment 7L – Unit Conversions with Ideal Gas Law

30 Points

Complete the following problems based on the ideal gas law

Base Units

P: atm
V: L
T: K
n: mol

Ideal Gas Law Forms	$P = \frac{nRT}{V}$	$V = \frac{nRT}{P}$	$n = \frac{PV}{RT}$	$T = \frac{PV}{nR}$
Ideal Gas Constant [R]	R = 0.0821 $\frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}}$	1 atm = 760mmHg = 101.3kPa	1L = 1000mL	
K = °C + 273.15 (Find k)		(Find °C) °C = K - 273.15		

Solve for P
P = ___ atm, V = 3.84L,
n = 1.34mol, T = 283.40K

atm → kPa
Convert P = ___ atm to P = ___ kPa

$$P = \frac{nRT}{V}$$

P = $\frac{1.34 \cancel{\text{mol}} \cdot 0.0821 \frac{\cancel{\text{L}} \cdot \cancel{\text{atm}}}{\cancel{\text{mol}} \cdot \cancel{\text{K}}} \cdot 283.40 \cancel{\text{K}}}{3.84 \cancel{\text{L}}}$

P = $\frac{8.12 \cancel{\text{atm}}}{101.3 \cancel{\text{kPa}}}$ | $\frac{1 \cancel{\text{atm}}}{101.3 \cancel{\text{kPa}}}$

P = 8.12 atm

P = 822.56 kPa

P = 2.48atm, V = ___ L,
n = 4.24mol, T = 472.41K

Convert V = ___ L to V = ___ mL

V =

V =

V = L

V = mL

P = 5.28atm, V = 2.57L,
n = 2.47mol SO₂, T = ___ K

Convert T = ___ K to T = ___ °C

T = $\frac{5.28 \cancel{\text{atm}} \cdot 2.57 \cancel{\text{L}}}{0.0821 \frac{\cancel{\text{L}} \cdot \cancel{\text{atm}}}{\cancel{\text{mol}} \cdot \cancel{\text{K}}} \cdot 2.47 \cancel{\text{mol}}}$

T = 66.92 - 273.15 *
T = -206.23 °C

T = 66.92 K

Convert k → °C
T = k - 273.15

$ml \rightarrow L$ [1L = 1000 mL]

Convert $V = 384.30\text{ mL}$ to $V = \text{---} L$
(start)

V =	384.30 mL	1 L
		1000 mL

V = 0.38430 L

(Don't need to round)
 $T = 48.28^\circ\text{C}$, convert to K

T =

T = K

Convert $P = 928.38\text{ mmHg}$ to $P = \text{---} \text{ atm}$

P =		

P = atm

$P = 2.83\text{ atm}$, $V = \text{---} L$,
 $n = \text{---} \text{ mol}$, $T = 293.2\text{ K}$

n =	2.83 atm · 0.38430 L
	0.0821 $\frac{L \cdot atm}{mol \cdot K}$ · 293.2 K

n = 0.045 mol

$P = \text{---} \text{ atm}$, $V = 62.14\text{ L}$,
 $n = 3.41\text{ mol}$, $T = \text{---} \text{ K}$

P =

P =

P =

$P = \text{---} \text{ atm}$, $V = \text{---} L$,
 $n = 0.93\text{ mol}$, $T = 391.48\text{ K}$

V =	

V =