Name _____ Period _____

College Prep Chemistry of the Earth

Assignment 6I – *Mass of an Ideal Gas* 20 Points

Complete the following problems based on the ideal gas law

Find mol A

Ideal Gas Law Forms				
PV = nRT	$P = \frac{nRT}{V}$	$V = \frac{nRT}{P}$	$n = \frac{PV}{RT}$	$T = \frac{PV}{nR}$
Ideal Gas Constant [*R*]	R = 0.0821 $\frac{L \cdot atm}{mol \cdot K}$			

mol A → mass A

Eqn to find mol A

$n = \frac{PV}{RT}$

P = 0.94atm, V = 59.38L, n = ____mol CO_2, T = 428.45K	
n =	$\frac{0.94 atm \cdot 59.38 L}{0.0821 \frac{L \cdot atm}{mol \cdot K} \cdot 428.45 K}$
n =	$1.59 mol\ CO_2$

Molar Mass CO_2 = 44.01g/mol mass CO_2 = ____g CO_2		
mass CO_2 =	$1.59 mol\ CO_2$	$\frac{44.01 g\ CO_2}{1 mol\ CO_2}$
mass CO_2 =	$69.98 g\ CO_2$	

P = 1.85atm, V = 36.37L, n = ____mol H_2O, T = 327.49K	
n =	
n =	

Molar Mass CO_2 = 18.02g/mol mass H_2O = ____g H_2O		
mass H_2O =		
mass H_2O =		

P = 4.85atm, V = 18.48L, n = ____mol SO_2, T = 526.27K	
n =	
n =	

Molar Mass SO_2 = 64.07g/mol mass SO_2 = ____g SO_2		
mass SO_2 =		
mass SO_2 =		

Step 1: mass$_A$ → mol$_A$ Step 2: mol$_A$ → P, V, or T$_A$ (Pick eqn.)

Converting to mol$_A$

mass HCN = 47.48g, n = ____mol HCN
Molar Mass HCN = 27.03g/mol

n =	47.48 g HCN	1 mol HCN / 27.03 g HCN
n =	1.76 mol HCN	

P = 2.35atm, V = ____L,
n = ____mol HCN, T = 384.58K

Step 1

Solve for V: $V = \frac{nRT}{P}$

V =	$1.76\,mol \cdot 0.0821 \frac{L \cdot atm}{mol \cdot K} \cdot 384.58\,K$ / 2.35 atm
V =	23.65 L HCN

mass HCl = 67.32g, n = ____mol HCl
Molar Mass HCl = 36.36g/mol

n =	
n =	

P = 0.82atm, V = 42.84L,
n = ____mol HCl, T = ____K

T =	
T =	

mass SO_3 = 47.48g, n = ____mol SO_3
Molar Mass SO_3 = 80.07g/mol

n =	
n =	

P = ____atm, V = 41.32L,
n = ____mol SO_3, T = 391.48K

P =	
P =	

mass Cl_2 = 183.42g, n = ____mol Cl_2
Molar Mass Cl_2 = 70.90g/mol

n =	
n =	

P = 0.95atm, V = ____L,
n = ____mol Cl_2, T = 459.49K

V =	
V =	