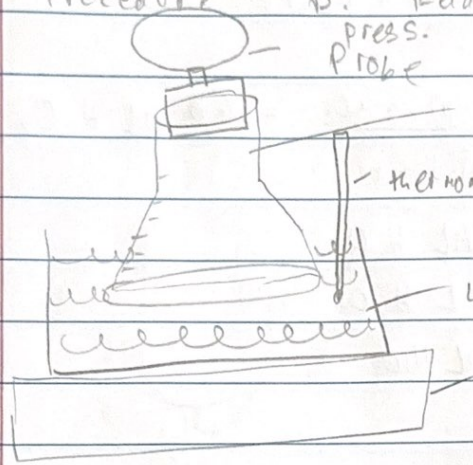
Lab 5 - Gas laws

Procedures D + E

Procedure D: Relationship Between P and T RQ(2)



$P \propto T$

$P = \frac{nR}{V} T$

$\frac{nR}{V}$ constant

$P = .0028\,T + .1487$

time	TCuP °C	pressure (kPa)
0	26.57	101.06
20	27.45	101.53
40	28.95	101.90
60	29.7	102.29
80	31.07	102.61
100	32.32	103.14
120	33.32	103.52
140	35.32	104.06
160	36.63	104.37
180	37.85	104.75
200	39.38	104.94
220	40.82	105.10
246	42.76	105.61
260	43.51	106.24
280	44.8	106.55

Part E: V vs n RQ(1)

$2H_2O_2(aq) \rightarrow 2H_2O(l) + \overbrace{O_2(g)}^{0}$

0.005 → 0.05

$$.01 \text{ mol } O_2 \left| \frac{2 \text{ mol } H_2O_2}{1 \text{ mol } O_2} \right| \frac{34.0147 \text{ g } H_2O_2}{1 \text{ mol } H_2O_2} = .68 \text{ mL } H_2O_2$$

.02 mol O_2 = 1.36 mL H_2O_2

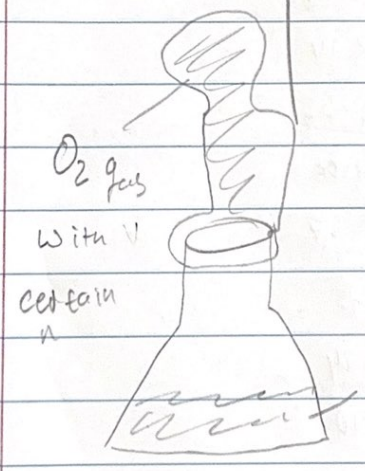
.03 mol O_2 = 2.04 mL H_2O_2

.04 mol O_2 = 2.72 mL H_2O_2

mL H_2O_2 =

.685

mol O_2	H_2O_2 (mL)	Volume(mL)
.01	.68	5 mL
.02	1.36	25 mL
.03	2.04	40 mL
.04	2.72	50 mL

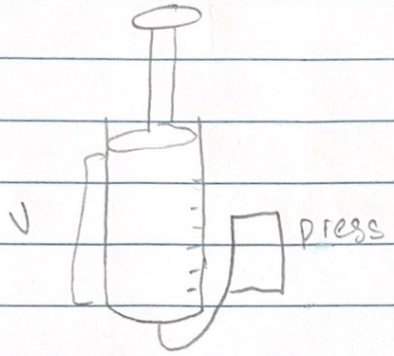


$V \propto n$

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

Solution $H_2O_2(aq)$ and $Fe(NO_3)_3$ (aq)
w/ certain volume

Relating P and V

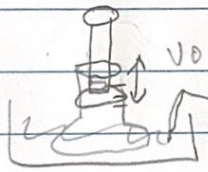


$P \propto \frac{1}{V}$

$P = \underbrace{nRT}_{\text{constant}} \left(\frac{1}{V}\right)$

Relating

Relating V and T



$P \propto T$

$V = \underbrace{\frac{nR}{P}}_{\text{constant}} T$

R Q's:

① What is V and n relationships for gas @ room conditions when P & T are constant?

② What is the P and T relation for a gas when V and n are constant?

③ What is the V and T relation for a gas when P and n are constant?