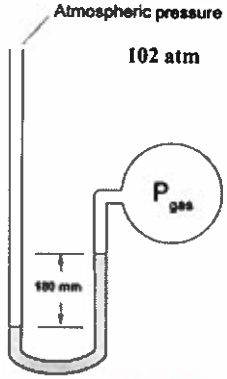
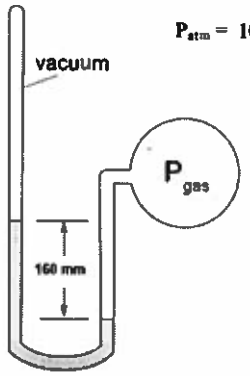
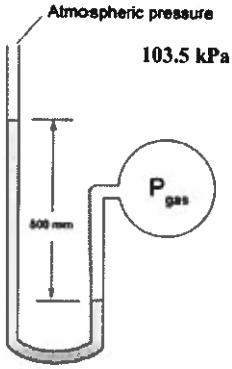
$\frac{v_1}{v_2}=\frac{\sqrt{M_2}}{\sqrt{M_1}}$ $\frac{d_1}{d_2}=\frac{\sqrt{M_2}}{\sqrt{M_1}}$ $\frac{t_1}{t_2}=\frac{\sqrt{M_1}}{\sqrt{M_2}}$ $P_1V_1=P_2V_2$ **Gases quiz v4** **Name:** Answers

1.00 atm = 760 mm Hg = 101.3 kPa **Show your work.** **Round to sig.figs.**

1. Calculate the pressure of the enclosed gases in each manometer below. Show your work. (6)







A) P_{gas} = 102 atm B) P_{gas} = 21.3 kPa C) P_{gas} = 1277 mm Hg

$\frac{180mmHg}{760mmHg}=\frac{x}{1.00atm}$ $\frac{160mmHg}{760mmHg}=\frac{x}{101.3kPa}$ $\frac{x}{760mmHg}=\frac{103.5kPa}{101.3kPa}$

$x=0.236842\rightarrow 0.237atm$ $x=21.3kPa$ $x=777mmHg$

$P_{Gas}=P_{atm}-h$ $P_{gas}=P_{atm}+h$

$=102-0.237atm$ $=777+500$

$P_{Gas}=102$ $P_{Gas}=1277mm\ Hg$

2. Calculate the ratio of diffusion velocity of carbon dioxide (CO_2) with that of hydrogen gas (H_2) at the same temperature. (State your answer in a sentence.) (2)

$\frac{V_{H_2}}{V_{CO_2}}=\sqrt{\frac{M_{CO_2}}{M_{H_2}}}=\sqrt{\frac{44.01}{2.02}}=4.66767=4.67$

Hydrogen diffuses 4.67 times faster than carbon dioxide

3. Fluorine gas diffuses 45.8 m in 10.1 s at a given temperature and pressure. How fast would chlorine gas diffuse over the same distance and conditions?

$\frac{t_{F_2}}{t_{Cl_2}}=\frac{\sqrt{M_{F_2}}}{\sqrt{M_{Cl_2}}}$ $\frac{10.1}{t_{Cl_2}}=\frac{\sqrt{38.00}}{\sqrt{70.90}}$ $t_{Cl_2}=13.8s$

$t_{Cl_2}=13.7960$

accept: $v=\frac{d}{t}=\frac{45.8}{13.8}=3.32m$

4. A gas with a volume of 0.053 L at a pressure of 95.1 kPa is allowed to expand until the volume reaches 0.065 L. What is the pressure at the new volume? (2)

$P_1V_1=P_2V_2$

$(95.1kPa)(0.053L)=P_2(0.065L)$

$P_2=77.5431\ kPa$

78 kPa