Ch 13 #10

Just treat the diameter like the ‘length’ of this circular object. Then calculate the ΔT necessary to cause this particular ΔV. At the end, don’t forget that you were asked for T_{final}, not for ΔT.

Note: There’s no need to convert cm to meters in this problem.

Ch 13 #11

This problem becomes relatively simple if you just assume some particular mass of water, like maybe 1000kg of water. Then this can really be treated as a volume expansion problem, where you relate mass to volume by remembering $\rho=m/V$. When you get to the end, don't forget that they asked for a final density, so find it with your assumed mass (1000kg).

Ch 13 #14

Think of this one by following the work we did on the volume expansion example from in class. On that one, we found ΔV_{spill} by subtracting $\Delta V_{container}$ from ΔV_{fluid} . To summarize that idea, which will always work when the fluid and container both expand, resulting in a spill: $\Delta V_{net} = \Delta V_{fluid} - \Delta V_{container}$

So, the only difference about this one is that you were told ΔV_{spill} and enough info to calculate ΔV_{fluid} , and asked to work backwards to find one of the variables within $\Delta V_{container}$.

Ch 13 #30

This is just a PV/T kind of problem, but it might seem odd that you weren't told actual values for volume. But you were told a relationship, so just assume a value for V_1 (like maybe $1m^3$), and then plug in the appropriate corresponding value for V_2.

Ch 13 #33

You could maybe get confused by the chemistry on part A, so here's some help…

$$\begin{array}{c|c} 18.5\cancel{g}_{N2} & 1mol_{N2} \\ \hline & 28\cancel{g}_{N2} \end{array} = 0.66mol_{N2}$$

Once you've got number of moles ('n'), you shouldn't have much trouble with PV=nRT.

For part B, just use those same converting strategies again.

Ch 13 #35

At some point you'll need to do some pressure or volume converting. Remember that there's an alternate value of R if you're in liters and atmospheres. If you use this, you get 2375atm, which you can convert to Pa.

Your other option is to begin with converting liters to m^3, using the fact that $1L = 10^{-3}m^3$.

Ch 13 #41

Remember the second version of the ideal gas law, $PV=Nk_BT$, deals with the # of molecules, N. So this problem is asking you to solve for N/V. (Remember that k_B is in SI units, so use all SI values.)

Ch 13 #42

This isn't really an ideal gas problem (since it's a liquid), but it's more of a mole/Avogadro problem.

Start by figuring out the mass of water in 1L, based on knowing water's density. Then use that mass to find moles, and then moles to find molecules.

Ch 13 #49

Think about how much larger T would need to get in order for square root of T to double.

Ch 13 #55

Since v_{rms} depends on temperature, begin by using the ideal gas law to find temperature.

Then calculate v_{rms}, but keep in mind that molar mass is for N_2 molecules. (Even though they didn’t tell you, nitrogen gas only exists in nature as N_2.)