1. Consider the following reaction at room temperature and atmospheric pressure: $C_5H_{12} + 8O_2 \longrightarrow 5CO_2 + 6H_2O$

(a) Find ΔH for this reaction when all substances are in their gaseous forms. Δ_fH for C_5H_{12} is -146.5 kJ. How much heat leaving or entering the system, and is the heat leaving or entering?

(b) Repeat (a) but now let H_2O on the right hand side be in the liquid form.

(c) Offer an explanation as to why there is a difference between the two cases.

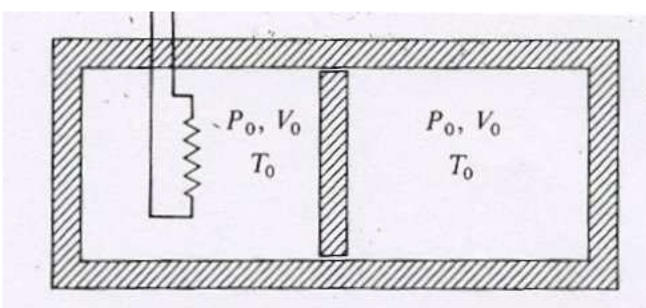
2. The figure below shows a cylinder in its initial state with thermally insulated walls containing a movable frictionless massless thermally insulated piston (shown as the center hatched bar). On each side of the piston are identical ideal gases ($\gamma = 1.50$) containing the same number of moles, n, each. The initial pressure, P_0, volume, V_0, and temperature, T_0, are also the same on both sides of the cylinder. By means of a heating coil in the gas on the left side of the piston, heat is supplied slowly to the gas on the left. It expands and compresses the gas on the right side until the final pressure on both sides has increased to $27P_0/8$. [Hint: think about which side(s) may or may not be undergoing adiabatic expansion or compression.] For each of the questions below, express the final result in terms of n, R, and T_0.

(a) What is the final temperature of the gas on the right?

(b) What is the work done on the gas on the right?

(c) What is the final temperature of the gas on the left?

(d) How much heat flows into the gas on the left?



3. Do problem 2.3 in the text. For part (g), a rough hand sketch is sufficient.

4. Do problem 2.17 in the text.