P B4 (pg 1 of 2) **Manometers and Barometers**

Name

In all of these problems, the tubes are very narrow and any volume caused by the tube is considered inconsequential.

1. Determine the gas pressure inside each bulb. Assume the atmospheric pressure is 755 mm.



2. Draw the position and relative heights of the columns of mercury for each bulb. Assume the atmospheric pressure is 760 mm.



- 3. At the start valves at X and Y are closed, and Flask J is empty.
 - a. What is the pressure in J?
 - b. What is the pressure in Bulb K?
 - c. What is the air pressure in the room?
 - d. When valve X is opened, determine the pressure in Bulbs A & B.
 - e. When valve Y is opened, draw and label the appropriate levels at the open-end



- 1. Determine the gas pressure inside each bulb. Assume the atmospheric pressure is 755 mm.
 - a. The gas pressure inside is 400 mm Hg. You can read the pressure of a closed-end manometer directly.
 - b. The gas pressure inside is **700 mm Hg**. You can tell this because the inside gas is losing the push-pull and is 55 mmHg less pressure than the outside air pressure which is stated in the directions to be 755 mmHg.
 - c. The gas pressure inside is **1400 mm Hg**. You can tell this because the gas inside is pushing harder than the gas outside. It is pushing harder by 645 mmHg. Thus 755 + 645 would be the total pressure inside.
 - d. This closed-end manometer must be broken. Since there is supposed to be "nothing", in the closed-end, there would be no push thus the lowest the mercury could be on the side away from the the gas bulb would be flat with the other side.
- 2. Draw the position and relative heights of the columns of mercury for each bulb. Assume the atmospheric pressure is 760 mm.



- 3. At the start valves at X and Y are closed, and Bulb B is empty.
 - a. Since Flask J is empty, the pressure would be 0 mm Hg
 - b. The pressure in Flask K is 400 mmHg
 - c. Since the tubes were empty, you can assume that the outside pressure is 760 mmHg because the outside air is pushing the mercury up towards valve Y to a height of 760 mm
 - d. Assuming that Flasks J and K are the same size, the when valve x is opened, the volume will be twice as big which will reduce the pressure to half. Thus both bulbs will have a pressure of 200 mmHg
 - e. When Valve Y is opened, draw and label the appropriate levels at the open-end, and the new level at the closed-end.

