Chemistry 236 -- Quiz 12

Lab Day ___

November 28, 2007 — Physical Adsorption of Gases

Pledge and signature:

Note: If you want your paper returned folded (*i.e.*, score concealed), please print your name on the back.

1. (3) In an adsorption experiment, the manifold volume is calibrated with a bulb having V = **34.5 cm^3**. Gas having P = **207 Torr** is expanded from the bulb to the rest of the system (previously evacuated), giving P = **79.3 Torr**. Calculate the volume of the rest of the system.

2. (3) The volume just calculated includes a small connecting region between the calibration bulb and the manifold. Gas of P = **195.2 Torr** is trapped in this section and then expanded into the manifold (previously evacuated), giving P = **19.2 Torr**. Calculate the volumes of (a) the connecting region and (b) the manifold.

3. (4) In a different system, a sample cell of volume **13.3 cm^3** is connected to a manifold having V = **63.5 cm^3**. The system is initially at T = **299 K** with N_2 gas at P = **178.3 Torr**. Then the fat part of the sample cell is immersed in liquid N_2 (**77.0 K**) and the pressure drops to **139.2 Torr**. Calculate the "cold volume."

4. (6) Adsorption data for the adsorbed amount v (STP cm^3) can be analyzed by fitting to two different relationships, one of which gives a straight-line presentation.
   (a) Give the quantities "y" to be taken as dependent variable in each of these fits.
   (b) Assuming the measured vs have constant uncertainty, how should the data in each of these two fits be weighted?
   (c) If these data have proportional uncertainty (σ_v v), how should the data be weighted in each case?