

Chemistry 230 -- Quiz 2
September 14, 2001 — Tellinghuisen

Pledge and signature:

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

1. (8) **Short problems:**

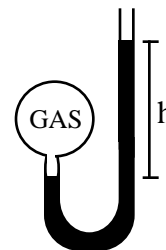
(a) Evaluate $\int_2 V^{-2} dV$:

(b) Calculate $\log_{10} (3.79 \times 10^{987})$:

(c) Calculate $\log_{22} 8$:

(d) Find dy/dx if $xy = y - 2$:

2. (3) A sample of gas is contained in the mercury manometer shown at right. If the atmospheric pressure is 744 torr and $h = 55$ mm, what is the pressure of the trapped gas (in torr) ?



3. (10) Give the van der Waals equation for a real gas, and use it to calculate the pressure of a sample of CO_2 at 311K and a concentration of 1.000 mol/L. For CO_2 , $a = 3.59 \times 10^6 \text{ cm}^6 \text{ atm mol}^{-2}$ and $b = 42.7 \text{ cm}^3/\text{mol}$. (See board for R values.)

4. (5) A hypothetical gas obeys the equation of state $PV = nRT (1 + aP + bP^2)$, where a and b are constants. Give the definition of α and use it to obtain an expression for α for this gas.