Chemistry 236 -- Practice Quiz 4
## October 1, 2003 — Triple Point: Phase Equilibrium

1. The normal boiling point of oxygen (O_2) is –183°C. A vessel standing open in the laboratory at atmospheric pressure and initially full of liquid oxygen is now half full. Therefore the temperature of the remaining liquid oxygen must be

    a. below –183°C.   b. –183°C.   c. between –183°C and 0°C.
    d. above 0°C.   e. This cannot be predicted.

2. Consider the apparatus pictured to the right. The 250-mL chamber is filled with $N_2(g)$ at 25°C to a pressure of 2.00 atm. The 1.000-L chamber is filled with $O_2(g)$ at 25°C to a pressure of 4.50 atm. If the center valve (**b**) is opened and no temperature change is observed, the final pressure in the apparatus will be
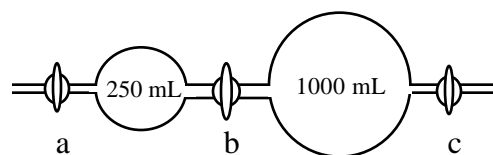
    a. 0.400 atm   b. 3.60 atm   c. 4.00 atm   d. 6.5 atm   e. none of these

3. For water near its triple point, $H_{fus} = 6.0$ kJ mol^{-1} and $H_{vap} = 45.0$ kJ mol^{-1}. Thus H for the sublimation process, $H_2O(s) \quad H_2O(g)$, is

    a. 6.0 kJ mol^{-1} b. 39.0 kJ mol^{-1} c. 45.0 kJ mol^{-1} d. 51.0 kJ mol^{-1}
    e. This cannot be determined from the available information.

4. Consider the accompanying figure, which shows the natural log of the vapor pressure of Br_2 as a function of $1/T$, for both solid and liquid phases. Using this figure, estimate (A) the triple point T and P; (B) the normal boiling point T; (C) $H_{m,vap}$; (D) $H_{m,sub}$; and (E) $H_{m,fus}$.