WORKSHEET #9

Name: Date: Period: Seat #:

Show work for each problem with boxed answer.

A mixture of nitrogen and neon gases contains equal moles of each gas and has a total mass of 10.0 g. What is the density of this gas mixture at 500 K and 15.0 atm? Assume ideal gas behavior. (8.8 g/L)

What is height (in mm) of a column of ethanol if the pressure at the base of the column is 1.50 atm? (The density of Hg is 13.534 g/cm$_3$ and ethanol is 0.789 g/cm$_3$.) (19,555 mmC$_2$H$_5$OH)

1.0 L of liquid nitrogen is kept in a closet measuring 1.0 m by 1.0 m by 2.0 m. Assuming that the container is completely full, that the temperature is 25.0 °C, and that the atmospheric pressure is 1.0 atm, calculate the percent (by volume) of air that would be displaced if all the liquid nitrogen evaporated. (Liquid nitrogen has a density of 0.807 g/mL.) (35.2%)

A humidifier is used in a bedroom kept at 22.0 °C. The bedroom's volume is 4.0 x 10$_4$ L. Assume that the air is originally dry and no moisture leaves the room while the humidifier is operating.
a. If the humidifier has a capacity of 3.00 gallons of H$_2$O, will there be enough to saturate the room with water vapor (Vp of H$_2$O at 22. °C = 19.83 mmHg)? (yes, prove it)
b. What is the final pressure of water vapor in the room when the humidifier has vaporized two-thirds of its water supply? (0.254 atm)

20.0 g each of helium and an unknown diatomic gas are combined in a 1500. mL container. If the temperature is 298 K, and the pressure inside is 86.11 atm, what is the unknown gas? (Cl$_2$)