3. Consider the hydrocarbon pentane, $C_5H_{12}$ (molar mass 72.15 g).

   (a) Write the balanced equation for the combustion of pentane to yield carbon dioxide and water.

   (b) What volume of dry carbon dioxide, measured at 25°C and 785 mm Hg, will result from the complete combustion of 2.50 g of pentane?

   (c) The complete combustion of 5.00 g of pentane releases 243 kJ of heat. On the basis of this information, calculate the value of $\Delta H$ for the complete combustion of one mole of pentane.

   (d) Under identical conditions, a sample of an unknown gas effuses into a vacuum at twice the rate that a sample of pentane gas effuses. Calculate the molar mass of the unknown gas.

   (e) The structural formula of one isomer of pentane is shown below. Draw the structural formulas for the other two isomers of pentane. Be sure to include all atoms of hydrogen and carbon in your structures.

$$
\begin{array}{ccccccccc}
& H & & H & & H & & H & & H \\
& | & & | & & | & & | & & | \\
H- & C & - & C & - & C & - & C & - & C & -H \\
& | & & | & & | & & | & & | \\
& H & & H & & H & & H & & H
\end{array}
$$

**GO ON TO THE NEXT PAGE.**