1. The normal boiling point of ethanol (C\textsubscript{2}H\textsubscript{5}OH) is 78.3 °C, and its molar enthalpy of vaporization is 38.56 kJ/mol. What is the change in entropy in the system when 68.3 g of C\textsubscript{2}H\textsubscript{5}OH (g) at 1 atm condenses to a liquid at the normal boiling point?

2. Using data from Appendix C, calculate $\Delta H^\circ$, $\Delta S^\circ$, and $\Delta G^\circ$ at 25 °C for the following reaction:

   \[ \text{BaCO}_3 (s) \rightarrow \text{BaO} (s) + \text{CO}_2 (g) \]

   Show that $\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$

3. Use data from Appendix C to calculate the equilibrium constant, K, at 298 K for the following reaction:

   \[ \text{C}_2\text{H}_5\text{OH} (g) \rightleftharpoons \text{C}_2\text{H}_4 (g) + \text{H}_2\text{O} (g) \]