Chem. 142 Quiz #2

Name ____________________________

15 points

Helpful constants: \( R = 8.314 \text{ J/mol K} = 8.314 \times 10^2 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \) \quad \text{Kelvin} = ^\circ \text{C} + 273 \quad \overline{C}_v = \frac{3}{2} R

1. (5 points) Define the following:

a. Adiabatic:

\[ \text{No heat exchange between system and surroundings} \]

b. State function (give an example):

\[ \text{Path independent} \quad \Delta F = F_f - F_i \]

\[ \Delta E, \Delta H, \Delta G \]

c. Isolated System:

\[ \text{No exchange of heat or matter} \]

d. 1st law of thermodynamics

\[ \text{Energy is conserved} \quad E = U + W \]

e. Entalpy

\[ q_p = C_p \Delta T \]

2. (5 points) Explain the significance of the constants “a” and “b” in the van der Waals equation of state:

\[ \left( P + \frac{n^2 a}{V^2} \right) (V - nb) = nRT \]

“a” describes the intermolecular forces (+) or (-)

“b” accounts for the particle volume

3. (5 points) Explain the difference between the work done under reversible and irreversible isothermal conditions using a PV diagram. (hint... start by labeling each axis)