1. Write down the two versions of the Gibbs equation for a <u>general substance.</u>
    a)

    b)

2. How do the above two versions of the Gibbs equation simplify to respectively for an
    <u>ideal gas?</u>
    a)

    b)

3. For an <u>ideal gas</u> in its general case (*i.e.* variable specific heats), complete followings:

    $\Delta u = $ _____ (finite change in internal energy)

    $\Delta h = $ _____ (finite change in enthalpy)

    $\Delta s = $ _____ (finite change in entropy)

4. Determine if the following statements are true or false.
    a) *True/False*   The Gibbs equation is only true for internally reversible processes.

    b) *True/False* $\Delta h = c_p \, \Delta T$ AND $\Delta u = c_v \, \Delta T$ are only true for constant pressure
                        and constant specific volume processes in an ideal gas
                        respectively.

    c) *True/False*   The specific internal energy of an ideal gas depends only on its
                        temperature.

d) *True/False*   The specific enthalpy of an ideal gas depends only on its temperature.

e) *True/False*   The specific entropy of an ideal gas depends only on its temperature.

4. Under what conditions would the Ideal Gas Model be a good approximation to the real behavior of a substance in its gaseous state.

5. List the conditions of validity (assumptions) for the following commonly used relations:

a) $Pv^k = \text{constant}$

b) $s_2 - s_1 = s_2^0 - s_1^0 - R \log\left(\dfrac{P_2}{P_1}\right)$