1) Typically for solids (circle the correct answer – 2pts, LO#2, LO#4),
   a. \( C_p > C_v \)
   b. \( C_p \approx C_v \)
   c. \( C_p < C_v \)
   d. It depends on the solid, these are empirically determined constants

Why (2 pts, LO#2, LO#4)?

The specific heat is the amount of heat required to change the temperature of one kilogram of a substance by 1K. Since solids typically do not expand significantly when their internal energy is increased, there is little work done when they are heated. Therefore the amount of energy required to increase the temperature of a solid is approximately the same for a constant volume and a constant pressure process.

2) Consider the equation \( \delta q = c_p dT - v dp \)

a. In a sentence, explain the physical behavior or concept represented by this equation (2 pts, LO#1).

This equation is a statement of the First Law of Thermodynamics. Changes of energy of a system are balanced by heat transfer to the system and work done by the system. In other words, energy is conserved.

b. What assumptions are implied by this equation (3 pts, LO#4)?

This equation assumes that changes in internal energy are much larger than changes in other forms of energy (e.g., kinetic and potential). It also assumes that the process is quasi-static (or quasi-equilibrium). It also assumes that the substance behaves as an ideal gas.