SC527 Quiz 3

Name: _____

A thermodynamic system undergoes a three-step process. An adiabatic expansion takes it from state 1 to state 2; heat is added at constant pressure to move the system to state 3; and an isothermal compression returns the system to state 1. The system consists of a diatomic ideal gas with $C_V = 5R/2$. The number of moles is chosen so $nR = 100$ J/K.
The following information is known about states 2 and 3.
Pressure: $P_2 = P_3 = 100$ kPa
Volume: $V_3 = 0.5$ m^3
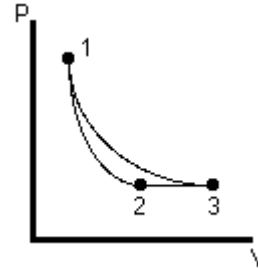
[2 points] (a) What is the temperature of the system in state 3?

[3 points] (b) The system does 20000 J of work in the constant pressure process that takes it from state 2 to state 3. What is the volume and temperature of the system in state 2?

$V_2 =$ $T_2 =$

[10 points] (c) Complete the table below, filling in the missing numerical values, with units of joules. The total work done by the system in the cycle is –19400 J. Note that there is a way to do this without integrating or using logarithms.

Process	Q	ΔU	W
1 → 2			
2 → 3			20000
3 → 1			
Complete cycle			-19400