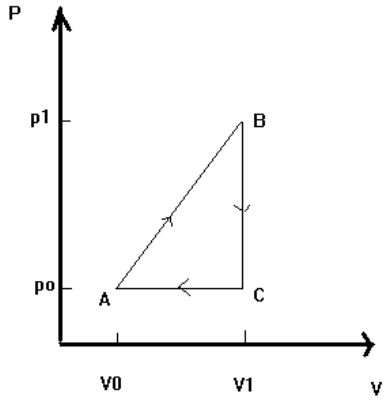
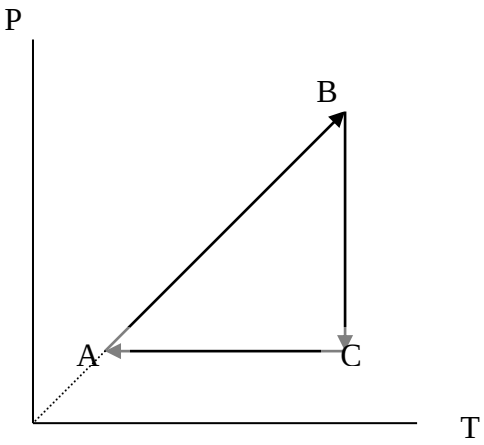
Chapter 19:

Question-1: Two moles of an ideal diatomic gas is taken through the cycle shown in the figure. Assume $p_1 = 3\ p_0$ and $V_1 = 3\ V_0$. p_0 is atmospheric pressure = $1.01\ 10^5$ Pa, and V_0 is 0.01 m^3. 24240 J of heat is transferred to the system in the process AB. What is the efficiency of this cycle? [efficiency part is chapter 20!]



Question-2:
An ideal gas undergoes the cyclic process shown in the figure from A to B to C and back to A.

a- sketch the PV diagram for this cycle and identify the steps during which heat is absorbed and those during which heat is expelled.
b- What is the overall result of the cycle in terms of Q, W and ΔE_{int}.



Question-3:
Helium is heated at constant pressure from 273 K to 373 K. The gas does 20.0 J of work during the process.

a- What is the mass of the helium?
b- What is the change in internal energy?

Chapter 20:

Question-1:
A heat engine performs 1000 J of work in each five cycles, and has an efficiency of 30%. For each cycle, how much energy is absorbed and how much is expelled?

Question-2:
A Carnot engine has an efficiency of 25% when the hot reservoir temperature is 500 ^{o}C. If we want to improve the efficiency to 30%, what should be the temperature of the hot reservoir? (assuming everything else remains unchanged).

Question-3:
One mole of an ideal monatomic gas, initially at 1.000 atm and a volume of 25 liters, is heated to a final state where the pressure is 2.000 atm and the

volume is 40 liters. Determine the change of entropy for this process.

Question-4:

An airtight freezer contains air at 25 ^{o}C and 1.000 atm. The air is then cooled to –18 ^{o}C. What is the change of entropy of the air?