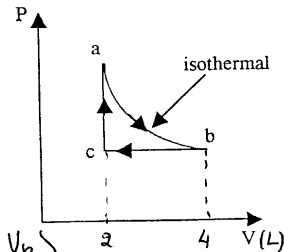


Physics 102Rec
Quiz # 4
Chapter 21

Name: Key Id#: _____ Sect#: _____

One mole of a diatomic ideal gas is taken through the cycle shown in the figure. If $T_a = 400$ K and $T_c = 200$ K, calculate

- (a) The change in entropy for each process
(b) The total change in entropy for the cycle.



2) $a \rightarrow b$ isothermal $\Delta S = n R \ln\left(\frac{V_b}{V_a}\right)$

$$\Delta S = (1)(8.31) \ln(2) = 5.76 \text{ J/K}$$

$b \rightarrow c$ isobaric $\Delta S = n C_p \ln\left(\frac{T_c}{T_b}\right) = (1)\left(\frac{7}{2} \cdot 8.31\right) \ln\left(\frac{200}{400}\right)$

$$= -20.16 \text{ J/K}$$

$c \rightarrow a$ isobaric $\Delta S = n C_v \ln\left(\frac{T_a}{T_c}\right) = (1)\left(\frac{5}{2} \cdot 8.31\right) \ln\left(\frac{400}{200}\right)$

$$= 14.4 \text{ J/K}$$

b) $\Delta S_{\text{cycle}} = 0$ as expected!!!

$$\Delta S = 5.76 - 20.16 + 14.4 = 0$$