

Name: _____

Key

ID # _____

1- A Carnot heat engine operates between two reservoirs at temperatures of 450 K and 350 K. If the engine absorbs 5.0×10^7 J/cycle, find the heat rejected (delivered) per cycle.

$$\frac{|Q_L|}{|Q_H|} = \frac{T_L}{T_H}$$

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$$|Q_L| = |Q_H| \frac{T_L}{T_H} = (5 \times 10^7) * \frac{350}{450} = 3.9 \times 10^7 \text{ J/cycle}$$

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2- Two moles of an ideal gas undergo an adiabatic free expansion from an initial volume of 0.6 L to 1.2 L. Calculate the change in entropy of gas.

$$\Delta S = nR \ln \frac{V_f}{V_i} + n C_{V,m} \ln \frac{T_f}{T_i}$$

$$= 2(8.31) \ln 2$$

$$= 11.5 \frac{\text{J}}{\text{K}}$$

free expansion

$$\Delta E_{int} = 0 \Rightarrow \Delta T = 0$$