

Physics 260 Homework Solution

Chapter 22 Entropy

1 PSE6 22.P.040

$$\Delta S = \frac{Q_2}{T_2} - \frac{Q_1}{T_1}$$

where $Q_1 = Q_2$ = amount of energy being transferred and T_2 is the temperature of the Earth.

2 PSE6 22.P.044

a.

$$V = \frac{nRT_i}{P_i}$$

b.

$$\Delta E_{int} = nC_V \Delta T$$

c.

$$W = 0$$

$$Q = \Delta E_{int}$$

d.

$$\Delta S_{argon} = \int_{T_i}^{T_f} \frac{dQ}{T} = \int_{T_i}^{T_f} nC_V \frac{dT}{T} = nC_V \ln \left(\frac{T_f}{T_i} \right)$$

e.

$$\Delta S_{bath} = \frac{-\Delta E_{int}}{T}$$
$$\Delta S_{total} = \Delta S_{argon} + \Delta S_{bath}$$

3 PSE6 22.P.041

$$\Delta S = \frac{\frac{1}{2}mv^2}{T}$$

4 PSE6 22.QQ.005

One microstate—all four deuces.