Physics 102Rec
Quiz # 4
Chapter 21

Name: Key Id#: Sect#:

1. What is the coefficient of performance of an ideal heat pump that brings heat from the outdoor at – 3 °C into a 22 °C house?

$$K = \frac{T_H}{T_H - T_C} = \frac{295}{25} = 11.8$$

2. The surface of the sun is approximately 6000 K and the temperature of the earth's surface is approximately 23 °C. What is the net entropy change when 1000 J of heat energy is transferred from the sun to the earth?

$$\Delta S_{sun} = -\frac{Q}{T_{sun}} = -\frac{1000}{6000} = -0.17 \text{ J/K}$$

$$\Delta S_{earth} = \frac{Q}{T_{earth}} = \frac{1000}{290} = 3.45 \text{ J/K}$$

$$\Delta S_{Total} = \Delta S_{sun} + \Delta S_{earth} = 3.28 \text{ J/K} > 0$$

because irreversible process.