39. (a) We substitute $\lambda = (2898\,\mu\text{m}\cdot\text{K})/T$ into the result of Exercise 3 of Chapter 39: $E = (1240\,\text{eV}\cdot\text{nm})/\lambda$. First, we convert units: $2898\,\mu\text{m}\cdot\text{K} = 2.898 \times 10^6\,\text{nm}\cdot\text{K}$ and $1240\,\text{eV}\cdot\text{nm} = 1.240 \times 10^{-3}\,\text{MeV}\cdot\text{nm}$. Hence,

$$E = \frac{(1.240 \times 10^{-3}\,\text{MeV}\cdot\text{nm})T}{2.898 \times 10^6\,\text{nm}\cdot\text{K}} = (4.28 \times 10^{-10}\ \text{MeV/K})T\ .$$

(b) The minimum energy required to create an electron-positron pair is twice the rest energy of an electron, or $2(0.511\,\text{MeV}) = 1.022\,\text{MeV}$. Hence,

$$T = \frac{E}{4.28 \times 10^{-10}\,\text{MeV/K}} = \frac{1.022\,\text{MeV}}{4.28 \times 10^{-10}\,\text{MeV/K}} = 2.39 \times 10^9\ \text{K}\ .$$