

$$3-21 \text{ a) } \lambda_{\max} T = 2.898 \times 10^{-3} \text{ mK} \quad (\text{Wien's law})$$

$$\lambda_{\max} = \frac{2.898 \times 10^{-3} \text{ mK}}{1150 \text{ K}} \\ = 2520 \text{ nm}$$

$$\text{b) fraction} = \frac{R(\lambda_{\max})}{R(\lambda_{\max})}$$

$$= \left(\frac{\lambda_{\max}}{\lambda_{\max}} \right)^5 \frac{e^{hc/\lambda_{\max} T} - 1}{e^{hc/2\lambda_{\max} T} - 1}$$

$$u_1 = hc/\lambda_{\max} T = \frac{1240}{(2520)(1150)(8.617 \times 10^{-5})} \\ = 4.9655$$

$$u_2 = hc/2\lambda_{\max} T = 2.4828$$

$$\text{frac} = \left(\frac{1}{2} \right)^5 \frac{e^{u_1} - 1}{e^{u_2} - 1} = 0.905$$