

13. Let $E_1 = 63 \text{ meV} + E_F$ and $E_2 = -63 \text{ meV} + E_F$. Then according to Eq. 42-6,

$$P_1 = \frac{1}{e^{(E_1 - E_F)/kT} + 1} = \frac{1}{e^x + 1}$$

where $x = (E_1 - E_F)/kT$. We solve for e^x :

$$e^x = \frac{1}{P_1} - 1 = \frac{1}{0.090} - 1 = \frac{91}{9} .$$

Thus,

$$P_2 = \frac{1}{e^{(E_2 - E_F)/kT} + 1} = \frac{1}{e^{-(E_1 - E_F)/kT} + 1} = \frac{1}{e^{-x} + 1} = \frac{1}{(91/9)^{-1} + 1} = 0.91 ,$$

where we use $E_2 - E_F = -63 \text{ meV} = E_F - E_1 = -(E_1 - E_F)$.