

$$\frac{n_i(\text{Si})}{N_{\text{Si}}} = \frac{7 \times 10^{16} \text{ electrons/m}^3}{5.00 \times 10^{28} \text{ atoms/m}^3}$$
$$= 1.4 \times 10^{-12} \text{ electron/atom}$$

(b) The difference is due to the magnitudes of the band gap energies (Table 18.3). The band gap energy at room temperature for Si (1.11 eV) is larger than for Ge (0.67 eV), and, consequently, the probability of excitation across the band gap for a valence electron is much smaller for Si.