18.21 In this problem we are asked to compute the intrinsic carrier concentration for PbS at room temperature. Since the conductivity and both electron and hole mobilities are provided in the problem statement, all we need do is solve for n and p (i.e., n_i) using Equation 18.15. Thus,

$$n_i = \frac{\sigma}{|e|(\mu_e + \mu_h)}$$

$$= \frac{25\ (\Omega\text{-m})^{-1}}{(1.602\ \text{x}\ 10^{-19}\ \text{C})(0.06\ +\ 0.02)\ \ \text{m}^2/\text{V-s}}$$

$$= 1.95\ \text{x}\ 10^{21}\ \text{m}^{-3}$$