

11. According to Eq. 42-9, the Fermi energy is given by

$$E_F = \left( \frac{3}{16\sqrt{2}\pi} \right)^{2/3} \frac{h^2}{m} n^{2/3}$$

where  $n$  is the number of conduction electrons per unit volume,  $m$  is the mass of an electron, and  $h$  is the Planck constant. This can be written  $E_F = An^{2/3}$ , where

$$A = \left( \frac{3}{16\sqrt{2}\pi} \right)^{2/3} \frac{h^2}{m} = \left( \frac{3}{16\sqrt{2}\pi} \right)^{2/3} \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s})^2}{9.109 \times 10^{-31} \text{ kg}} = 5.842 \times 10^{-38} \text{ J}^2\cdot\text{s}^2/\text{kg} .$$

Since  $1 \text{ J} = 1 \text{ kg}\cdot\text{m}^2/\text{s}^2$ , the units of  $A$  can be taken to be  $\text{m}^2\cdot\text{J}$ . Dividing by  $1.602 \times 10^{-19} \text{ J/eV}$ , we obtain  $A = 3.65 \times 10^{-19} \text{ m}^2\cdot\text{eV}$ .