

TASK 14.2

$$\frac{I_{\nu}(d)}{I_{\nu}(0)} = 0.05 = \exp(-\alpha d)$$
$$d = \frac{1}{2 \times 10^4 (h\nu - \varepsilon_g)^{1/2}} \ln \frac{1}{0.05} = \frac{1}{2 \times 10^4 \left(\frac{6.626 \times 10^{-34} \times 2.998 \times 10^8}{1.602 \times 10^{-19} \times 633 \times 10^{-9}} - 1.0 \right)^{1/2}} \ln \frac{1}{0.05} = 1.53 \times 10^{-4} \text{ cm}$$

TASK 14.3

(a)

$$\varepsilon(\text{eV}) = hc/e\lambda = 2.07 \text{ eV}$$

$$G = \frac{\alpha I_{\nu}(x)}{h\nu} = \frac{(0.9 \times 10^4)(0.03)}{(2.07)(1.6 \times 10^{-19})} = 8.15 \times 10^{20} \text{ cm}^{-3} \text{ s}^{-1} \text{ (assuming } \eta = 1)$$

(b)

$$N_0 = G\tau = (8.15 \times 10^{20})(10^{-7}) = 8.15 \times 10^{13} \text{ cm}^{-3}$$