Result: $E_{\text{quantum}} = 3.14 \times 10^{-19}$ J; Number of quanta per second = 1.6×10^{16} s^{-1}

Solution: You know the power of the laser (that is the energy emitted per second). You know the wavelength of the radiation. You want to calculate the number of quanta of radiation emitted per second.

From the wavelength you can calculate the energy of each quantum (in J). From the power you can determine the energy emitted in one second (in J): power × time = energy. (Units need to be adjusted in each calculation.) Then you can divide the total energy emitted during 1 s by the energy of one quantum to obtain the number of quanta.

$$E_{\text{quantum}} = \frac{hc}{\lambda} = \frac{(6.626 * 10^{-34}\,\text{J}\cdot\text{s})(2.9979 * 10^{8}\,\text{m/s})}{632.8 * 10^{-9}\,\text{m}} = \frac{1.986 * 10^{-25}\,\text{J}\cdot\text{m}}{632.8 * 10^{-9}\,\text{m}} = 3.139 * 10^{-19}\,\text{J}$$

$$E_{\text{emitted in 1 s}} = 5.0\,\text{mW} * \left(\frac{1\,\text{W}}{1000\,\text{mW}}\right) * 1\,s = 5.0 * 10^{-3}\,\frac{\text{J}}{\text{s}}\cdot\text{s} = 5.0 * 10^{-3}\,\text{J}$$

$$N_{\text{quanta emitted in 1 s}} = \frac{E_{\text{emitted in 1 s}}}{E_{\text{photon}}} = \frac{5.0 * 10^{-3}\,\text{J}}{3.139 * 10^{-19}\,\text{J}} = 1.6 * 10^{16}$$