Chapter 25

6. (a) $\text{light-year} = (3.00\times10^5\ \frac{\text{km}}{\text{s}})(365\ \text{d})(\frac{86{,}400\ \text{s}}{\text{d}}) = \boxed{9.46\times10^{12}\ \text{km}}$

(b) $\boxed{c = 1.00\ \text{ly/y}}$

(c) $c = (3.00\times10^8\ \frac{\text{m}}{\text{s}})(\frac{1\ \text{s}}{10^9\ \text{ns}})(\frac{1\ \text{ft}}{0.3048\ \text{m}}) = \boxed{0.984\ \text{ft/ns}}$

7. $d = (4.3\ \text{ly})(\frac{9.46\times10^{15}\ \text{m}}{1\ \text{ly}}) = \boxed{4.1\times10^{16}\ \text{m}}$

8. $d = ct = (3.00\times10^8\ \frac{\text{m}}{\text{s}})(12\ \text{min})(\frac{60\ \text{s}}{1\ \text{min}}) = \boxed{2.2\times10^{11}\ \text{m}}$

23. $f = \frac{c}{\lambda} = \frac{3.00\times10^8\ \frac{\text{m}}{\text{s}}}{0.30\times10^{-9}\ \text{m}} = \boxed{1.0\times10^{18}\ \text{Hz}}$

24. $f = \frac{c}{\lambda} = \frac{3.00\times10^8\ \frac{\text{m}}{\text{s}}}{470\times10^{-9}\ \text{m}} = \boxed{6.4\times10^{14}\ \text{Hz}}$

60. $I = I_0\cos^2\theta = (0.55\ \frac{\text{W}}{\text{m}^2})\cos^2 25.0° = \boxed{0.45\ \text{W/m}^2}$

62.

$I_1 = \frac{1}{2}I_0$

$I_2 = I_1\cos^2\theta = \frac{1}{2}I_0\cos^2\theta$

$\frac{I_2}{I_0} = \frac{1}{2}\cos^2 30.0° = \boxed{0.375}$

66. (a) $I = \boxed{\frac{1}{2}I_0}$

(b) $I = \frac{1}{2}I_0\cos^2 30.0° = \boxed{0.375I_0}$

(c) $I = 0.375I_0\cos^2(90.0°-30.0°) = \boxed{0.0938I_0}$

(d) $I = \frac{1}{2}I_0\cos^2 90.0° = \boxed{0}$