

Astronomy 1 – Introductory Astronomy

Spring 2014

Equations and constants and conversion factors for the first midterm

$$1 \text{ kilometer (km)} = 1000 \text{ meters (m)}$$

$$1 \text{ year (yr)} = 3.15 \times 10^7 \text{ seconds (s)}$$

$$1 \text{ day} = 86,400 \text{ s}$$

$$1 \text{ Watt (W)} \text{ is } 1 \text{ Joule (J)} \text{ per second (} W = J/s \text{)}$$

$$1 \text{ electron Volt (eV)} = 1.60 \times 10^{-19} \text{ J}$$

1 Hertz (Hz) is 1 cycle/second (1/s), the fundamental unit of frequency

$$c = 3.0 \times 10^8 \text{ m/s}$$

$$h = 6.63 \times 10^{-34} \text{ Js}$$

$$k = 1.38 \times 10^{-23} \text{ J/K}$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$

$$\sigma = 5.67 \times 10^{-8} \text{ W/m}^2/\text{K}^4$$

$$m_p = 1.67 \times 10^{-27} \text{ kg}$$

$$1 \text{ parsec (pc)} = 3.09 \times 10^{16} \text{ m} = 3.26 \text{ light years}$$

$$1 \text{ A.U.} = 1.5 \times 10^{11} \text{ m}$$

$$R_{\text{sun}} = 7.0 \times 10^8 \text{ m}$$

$$R_{\text{earth}} = 6.4 \times 10^6 \text{ m}$$

$$R_{\text{moon}} = 1.7 \times 10^6 \text{ m}$$

$$L_{\text{sun}} = 3.8 \times 10^{26} \text{ W}$$

$$M_{\text{sun}} = 2.0 \times 10^{30} \text{ kg}$$

$$M_{\text{earth}} = 5.97 \times 10^{24} \text{ kg}$$

$$\theta = \frac{57.3L}{d}$$

$$v = \frac{d}{t}$$

$$B = \frac{L}{4\pi d^2}$$

$$E = hf$$

$$\lambda f = c$$

$$\lambda_{max} = \frac{2.9 \times 10^6 \text{ nmK}}{T}$$

$$B_{surf} = \sigma T^4$$

$$\frac{v_r}{c} = \frac{\lambda_{shift} - \lambda_{rest}}{\lambda_{rest}}$$

$$F = ma$$

$$F_g = \frac{GMm}{r^2}$$

$$a_{cent} = \frac{v^2}{r}$$

$$v^2 = \frac{GM}{r}$$

$$p^2 = \frac{4\pi^2 a^3}{G(M + m)}$$

$$p^2 = \frac{a^3}{M}$$

$$M_1 r_1 = m_2 r_2$$

$$P = nkT$$

$$\rho = mn$$

$$p = \frac{1}{d}$$

$$L = 4\pi R^2 \sigma T^4$$

$$E = mc^2$$

$$A_{sphere} = 4\pi R^2$$

$$V_{sphere} = \frac{4}{3}\pi R^3$$

$$C_{circle} = 2\pi R$$

$$PE = mgh$$

$$KE = \frac{1}{2}mv^2$$