

Universal Gravitation

Chapter Eight- “phy 8 rev 1”

Physics

$$m_e = 5.98 \times 10^{24} \text{ kg}$$

$$r_e = 6.38 \times 10^6 \text{ m}$$

$$r_{oe} = 1.5 \times 10^{11} \text{ m (orbital)}$$

$$m_s = 1.99 \times 10^{30} \text{ kg}$$

$$r_s = 6.96 \times 10^8 \text{ m}$$

$$m_m = 7.22 \times 10^{22} \text{ kg}$$

$$r_m = 1.785 \times 10^6 \text{ m}$$

$$r_{om} = 3.9 \times 10^8 \text{ m (from earth)}$$

$$T_m = 27.3 \text{ days}$$

1. a) What is the period of the shuttle if it orbits 940 km above the earth’s surface? b) What would its velocity be?
2. What force does the earth apply to the shuttle (in #1) if it has a mass of $4.55 \times 10^3 \text{ kg}$?
3. What is the period of a planet that is $4.5 \times 10^{11} \text{ m}$ from the sun?
4. What would “g” be on the surface of the sun if it imploded and became half its size (radius)? ...still has same mass....
5. Use “Newton’s Variation of Kepler’s Third Law” to find the mass of the sun using Mars as the inferior object....show your work!!!!!!....total work or no points ($m_m = 6.42 \times 10^{23} \text{ kg}$; $r_m = 3.38 \times 10^6 \text{ m}$; $r_o = 2.278 \times 10^{11} \text{ m}$; $T_m = 1.88 \text{ yrs}$)
6. What is the period of a planet 6 times farther from the sun as the earth is?
7. If you weigh 784 N on earth what would you weigh 3 x further from the surface as you are now?

