Tarique Blue

 EET 3132

 4/29/16

***Remote Sensing Ch.4 HW***

**1)** $ω=\frac{v}{r}=\frac{2π}{84,164 sec}=7.29 x 10^{-5}Rad/s$

**2) If** $R\_{Earth}=6.38 x 10^{6} m=Altitude of Earth$**, then the period of the circular orbit is:**

$$τ=\frac{2π}{R\_{Earth}}\sqrt{\frac{r^{3}}{g\_{o}}}=\frac{2π}{6.38 x 10^{6} m}\sqrt{\frac{(6.38 x 10^{6})^{3} m}{9.8 m/s^{2}}}=5069 seconds$$

**3) Period of a Circular orbit @ Earth's surface:**

$$τ=\frac{2π}{R\_{Earth}}\sqrt{\frac{r^{3}}{g\_{o}}}=\frac{2π}{6.38 x 10^{6} m}\sqrt{\frac{(5.1 x 10^{14})^{3} m}{9.8 m/s^{2}}}=3.62 x 10^{15} seconds$$

**Velocity:**

$$v=\sqrt{\frac{g\_{o}}{r}}R\_{Earth}= \sqrt{\frac{9.8 m/s^{2}}{5.10 x10^{14}}}x 6.38 x 10^{6} m=0.88 km/s$$

**4)**

|  |  |  |
| --- | --- | --- |
| Planet | Period (Days) | Semi-Major Axis (Meters) |
| Mercury | 88 | 57909 |
| Venus | 225 | 108208 |
| Earth | 365 | 149598 |
| Mars | 686 | 2.27E+11 |
| Jupiter | 4333 | 7.78299E+11 |
| Saturn | 10759 | 1429000000 |
| Uranus | 30689 | 2875000000 |
| Neptune | 60182 | 4504000000 |
| Pluto | 90581 | 5.915E+12 |

**It obeys Kepler's 3rd law, which states that** $τ^{2}∝r^{3}$**.**

**5)**

**6) No, You cannot see Antarctica from a Geo orbit because the earth's gravity would pull the satellite and eventually crash to the surface.**

**7) Radius @ Perigee=** $R\_{p}=$ **1.5**$R\_{Earth}$**= 9.57**$ x 10^{6} m$

 **Radius @ Apogee=** $R\_{a}=$ **3**$R\_{Earth}$**= 19.14 x**$ 10^{6} m$

**Velocity @ Apogee = 3.73 km/s**

**Velocity @ Perigee=** $v\_{p}=\sqrt{\frac{2GMR\_{a}}{R\_{p}(R\_{a}+R\_{p})}}=\sqrt{\frac{2(3.98 x 10^{14})(19.14 x 10^{6})}{9.57 x 10^{6} (19.14 x 10^{6}+9.57 x 10^{6} )}}=$**7.44 km/s**