Ocober 26, 2012

Graded Group Problem #2

Dr C (no, not that one the other one!) has stated that any rock orbiting near the surface of an asteroid has an orbital period that only depends on the density of the asteroid. Is this true? What is the orbital period of an object orbiting a sphere of radius R_s and density ρ with an orbital radius almost identical to the sphere's radius? Verify this is a reasonable expression by computing the international space stations' orbital period. The international space station has an orbital height a few hundred km above the earth (less than 7% the radius of the Earth) and an orbital period of just over 90 minutes.

$G = 6.67 \times 10^{-11}\ Nm^2/kg^2$
$\rho = m/V$ where $V = 4\pi r^3/3$

$\rho_{earth} = 5520\ kg/m^3$
$R_{earth} = 6378\ km$
$M_{earth} = 5.972 \times 10^{24}\ kg$

NOTE:

Use a *Group Problem Solving Guide* to answer this problem. Clearly indicate your names as well as your lab time.