

Answer on Question #72548-Physics-Other

A satellite of mass 36kg revolves round the earth at a position 20m away. What angular velocity does the satellite make with the earth?

Solution

Using 3rd Kepler's Law we were able to get the semi-major axis distance in terms of the period of motion. Here we assume a simpler circular motion:

$$R^3 = \frac{GM}{4\pi^2} T^2$$
$$(20 + 6.37 \cdot 10^6)^3 = \frac{(6.67 \cdot 10^{-11})(5.972 \cdot 10^{24})}{4\pi^2} T^2$$
$$T = 5061 \text{ s.}$$

The angular speed is

$$\omega = \frac{2\pi}{T} = \frac{2\pi}{5061} = 0.0012 \frac{\text{rad}}{\text{s}}.$$

Answer: 0.0012 $\frac{\text{rad}}{\text{s}}$.

Answer provided by AssignmentExpert.com