Answer on Question #43411, Physics, Mechanics — Kinematics — Dynamics

While in a geosynchronous orbit around Earth, a 560 kg communications satellite has a weight of 125 N. The distance of the satellite from the Earth's surface is?

Solution

Weight is equal to gravity force.

$$F = \frac{GM_{Earth}m_{sat}}{(R_{Earth} + R_{orbit})^2}$$

Hence, distance to surface is

$$R_{orbit} = \sqrt{\frac{GM_{Earth}m_{sat}}{F}} - R_{Earth} = \sqrt{\frac{6.67 \cdot 10^{-11} \cdot 5.97 \cdot 10^{24} \cdot 560}{125N}} \approx 42.2 \cdot 10^6 - 6,4 \cdot 10^6 =$$

$$= 35.8 \cdot 10^6\, m = 35800km$$