Answer on question #61577, Physics - Mechanics | Relativity

Question A satellite revolves in a circular orbit around the earth at a certain height (h) above it. Suppose that h << R, the radius of the earth. Calculate the time period of revolution of the satellite

Solution Centrifugal force is equal to gravitational one. Hence:

$$m\nu^2(R+h) = G\frac{mM}{(R+h)^2}$$

where m is mass of satellite and ν is its angular velocity. Hence

$$\nu = \sqrt{G\frac{M}{(R+h)^3}}$$

So, the period is

$$T = \frac{2\pi}{\sqrt{G\frac{M}{(R+h)^3}}}$$