Answer on Question #57011-Physics-Solid State Physics

One planet is 6.00 x10^5 m. Another planet is 1.4 x 10^27kg. The radius is 7.14 x 10^7. Find the period.

Solution

Newton's second law has on one side, the force of gravity:

$$F = G\frac{m_1 m_2}{r^2} = \frac{m_1 v^2}{r}$$

$$G\frac{m_1 m_2}{r^2} = \frac{m_1(4\pi^2 r)}{T^2}$$

$$T = \sqrt{\frac{4\pi^2 r^3}{G m_2}} = \sqrt{\frac{4\pi^2(6.00\ \cdot 10^5 + 7.14 \cdot 10^7)^3}{6.67\ \cdot 10^{-11} \cdot 1.4\ \cdot\ 10^{27}}} = 1.26 \cdot 10^4 s = 3.5\ h.$$