

N 8.3

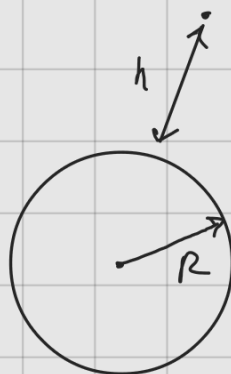
Дано:

$$R = 6380 \text{ км}$$

$$T = 23756 \text{ мин}$$

Найти: h

Решение:



$$1) T_c = T; \omega = \frac{2\pi}{T_c} = \frac{2\pi}{T}$$

$$2) h = \frac{\mu(e^2 - 1)}{p}; \quad v^2 = h + \frac{2\mu}{r}$$

$$r = \frac{p}{1 + e \cos \vartheta} = \frac{p}{1} = p \quad (e = 0) \Rightarrow$$

$$\Rightarrow h = -\frac{\mu}{r} \Rightarrow$$

$$3) \quad v^2 = -\frac{\mu}{r} + \frac{2\mu}{r} = \frac{\mu}{r}$$

$$v = \omega r = \frac{2\pi r}{T} \Rightarrow$$

$$\Rightarrow \omega^2 r^2 = \frac{\mu}{r} \Rightarrow r = \sqrt[3]{\frac{\mu}{\omega^2}} = \sqrt[3]{\frac{T^2 \mu}{4\pi^2}}$$

$$4) h = r - R = 562 R$$

Ответ: $h = 5,63 R$

N 8.9

Дано: Решение:

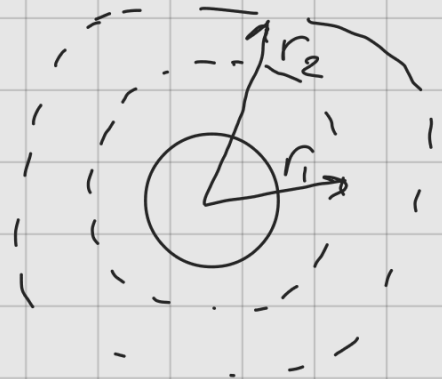
$r_1 \rightarrow r_2$

$\Delta T - ?$

$\Delta \Pi - ?$

$$1) \Pi = -\gamma \frac{Mm}{r} \Rightarrow$$

$$\Rightarrow \frac{\Pi_2}{\Pi_1} = \frac{r_1}{r_2}$$



$$2) h_1 = \frac{\mu(e^2 - 1)}{\rho} = -\frac{\mu}{r_1} \quad (\text{см. пред. задачу})$$

$$h_2 = -\frac{\mu}{r_2}$$

$$3) v_1^2 = h_1 + \frac{2\mu}{r_1} = \frac{\mu}{r_1}$$

$$v_2^2 = \frac{\mu}{r_2}$$

$$\Rightarrow \frac{v_2}{v_1} = \sqrt{\frac{r_1}{r_2}} \Rightarrow$$

$$\Rightarrow \frac{T_2}{T_1} = \frac{r_1}{r_2}$$

$$4) \frac{E_2}{E_1} = \frac{r_1}{r_2}$$

N 8.50

Дано: Решение:

$v, R, \Delta v$

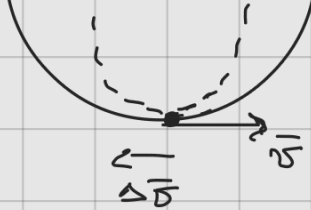
Найти:

ρ, e, φ_0

$$1) v = \sqrt{\frac{\mu}{R}} \Rightarrow \mu = v^2 R$$



$$2) R = \frac{p}{1-e}$$



$$3) (v - \Delta v)^2 = h + \frac{2\mu}{R} = \frac{\mu(e^2 - 1)}{p} + \frac{2\mu}{R} =$$

$$= \frac{v^2(e^2 - 1)}{1 - e} + 2v^2 = v^2(-e - e + 2) = v^2(1 - e)$$

$$\left(1 - \frac{\Delta v}{v}\right)^2 = 1 - e \Rightarrow e = 1 - \left(1 - \frac{\Delta v}{v}\right)^2 =$$

$$= 1 - \left(1 - 2\frac{\Delta v}{v} + \frac{\Delta v^2}{v^2}\right) = \frac{2\Delta v}{v} - \frac{\Delta v^2}{v^2} =$$

$$= \frac{\Delta v}{v^2} (2v - \Delta v) = e$$

$$4) p = R(1 - e) = R\left(1 - 1 + \left(1 - \frac{\Delta v}{v}\right)^2\right) =$$

$$= \frac{R}{v^2} (v - \Delta v)^2$$

5) При торможении спутник будет находиться в точке апогея, эта точка принадлежит новой траектории $\Rightarrow \varphi_0 = \pi$

$$\text{Поэтому: } p = R(1 - e) = R(1 - e) = R(1 - e) = R(1 - e)$$

Übung 1. $\epsilon = \frac{\Delta v}{v} (2v - \Delta v)$; $\rho = \frac{\kappa}{v^2} (v - \Delta v)$,

$$\varphi_0 = \pi$$