

Решение

$$1) T = 2\pi \sqrt{\frac{I}{mgd}}$$

$$2) I = I_0 + md^2$$

$$3) I_0 = \frac{ml^2}{12}$$

$$4) I = \frac{ml^2}{12} + md^2 = m\left(\frac{l^2}{12} + d^2\right)$$

$$5) T = 2\pi \sqrt{\frac{m\left(\frac{l^2}{12} + d^2\right)}{mgd}} = 2\pi \sqrt{\frac{\left(\frac{l^2}{12} + d^2\right)}{gd}}$$

$$6) d = x$$

$$7) \frac{dT}{dx} = 0, \text{ (условие минимума)}$$

$$8) T = 2\pi \left(\frac{\left(\frac{l^2}{12} + x^2\right)}{gx}\right)^{\frac{1}{2}}$$

$$9) 2\pi * \frac{1}{2} \left(\frac{\left(\frac{l^2}{12} + x^2\right)}{gx}\right)^{-\frac{1}{2}} \left[\frac{2x * gx - g\left(\frac{l^2}{12} + x^2\right)}{(gx)^2}\right] = 0$$

$$10) gx = 0, \quad \emptyset$$

$$11) 2x^2 - \frac{l^2}{12} + x^2 = 0, \quad x^2 = \frac{l^2}{12}, \quad x = \frac{l}{\sqrt{12}}, \quad x = d = \frac{0,5}{\sqrt{12}} \approx 0,144\text{м}$$