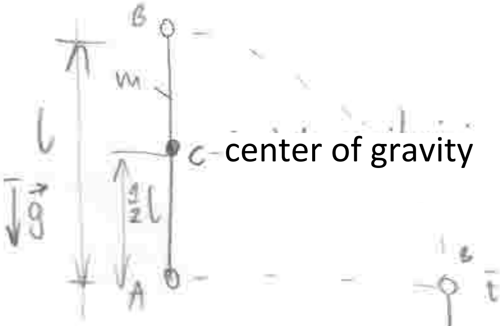

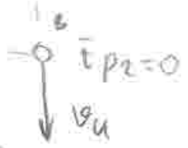

$E_{p1} = \frac{1}{2} m g l$

$E_{p2} = 0$

$E_{k1} = 0$

$E_{k2} = \frac{I_2 \omega^2}{2}$

$v = \omega \cdot l$

$\omega = \frac{v}{l}$

Known:
m - mass of rod [kg]
l - length of rod [m]
g - gravity acceleration [m/s^2]

Find:
final velocity v_k of rod point B, when rod will be in horizontal position

$E_{p1} + E_{k1} = E_{p2} + E_{k2}$

$I_0 = \frac{1}{12} m l^2$ moment of inertia for rod, when rotational axis is in the rod's center

$I_2 = I_0 + m d^2$ Parallel axis theorem, d is a distance between axes

$I_2 = \frac{1}{12} \cdot m l^2 + m \cdot \left(\frac{1}{2} l\right)^2$

$I_2 = \frac{1}{12} m l^2 + \frac{1}{4} m l^2$

$I_2 = \frac{1}{3} m l^2$

$E_{p1} = E_{k2}$

$\frac{1}{2} m g l = \frac{I_2 \omega^2}{2} \quad / \cdot 2$

$m \cdot g l = I_2 \cdot \omega^2$

$m \cdot g l = \frac{1}{3} m \cdot l^2 \cdot \left(\frac{v_k}{l}\right)^2$

$m \cdot g \cdot l = \frac{1}{3} m \cdot l^2 \cdot \frac{v_k^2}{l^2} \quad / : m \quad / \cdot 3$

$3 \cdot g \cdot l = v_k^2$

$$v_k = \sqrt{3 \cdot g \cdot l}$$