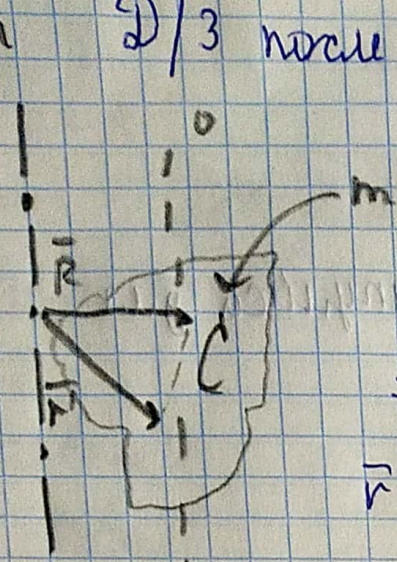**(1)**

$$I = \int dm \cdot \bar{r}^2 \; ; \quad I' = \int dm \cdot \bar{r}'^2$$

$$I_c = m \cdot \bar{R}^2 \; ; \quad \bar{R} = \frac{\int dm \cdot \bar{r}}{\int dm} \Rightarrow \int dm \, \bar{r} =$$

$$= \bar{R} \cdot \int dm = \bar{R} m \quad (1)$$
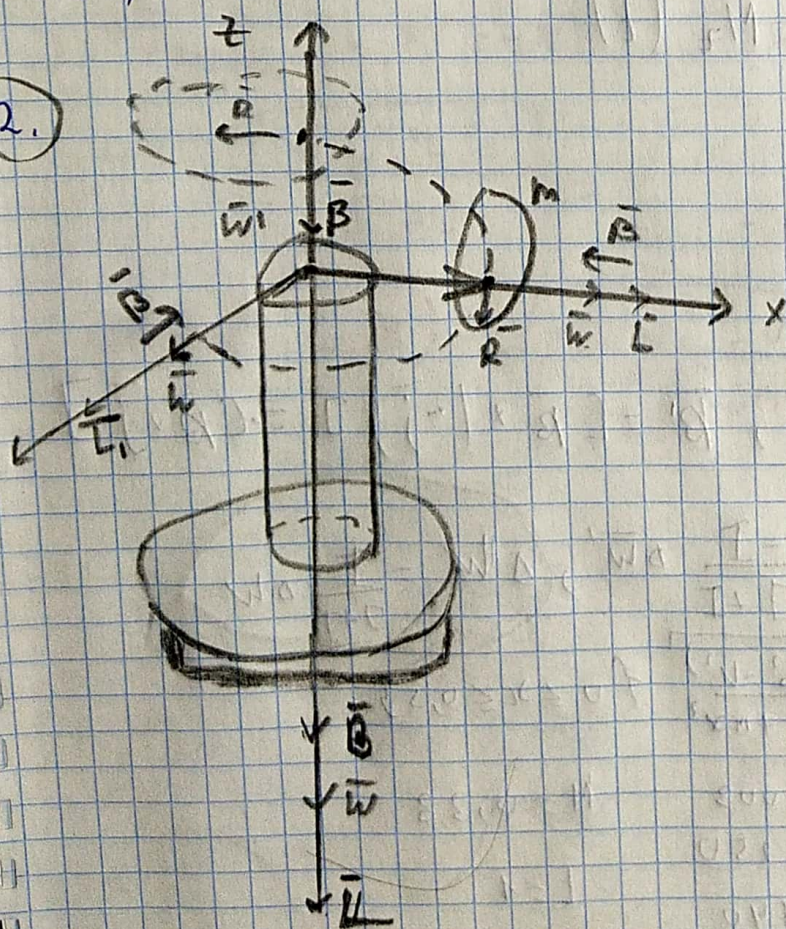
$$\bar{r} = \bar{r}' - \bar{R}$$

$$I = \int dm \, (\bar{r}' - \bar{R})^2 = \int dm \, (\bar{r}'^2 - 2\bar{r}'\bar{R} + \bar{R}^2) =$$

$$= \int dm \, \bar{r}'^2 - \int dm \, 2\bar{r}'\bar{R} + \int dm \, \bar{R}^2 = I' - 2\bar{R} \int dm \, \bar{r} + \bar{R}^2 \int dm =$$

$$\overset{①}{=} I' - 2\bar{R} \cdot \bar{R} m + \bar{R}^2 m = I' - \bar{R}^2 m \quad (2)$$

$$(2) \Rightarrow I' = I - \bar{R}^2 m$$

(2.)

$$I = m\bar{R}^2 \qquad I' = \frac{m\bar{R}^2}{2} + m\bar{R}^2$$

$$\vec{L} = I\bar{w} \qquad \bar{L'} = I'\bar{w}$$

По закону сохранения момента импульса для колеса:

$$\sum \bar{L} = \overline{const}$$

$$\bar{L} + \bar{L'} + \bar{L''} = \overline{const}$$

t) $\bar{L}_z^{(t)} - \bar{L} = \overline{const}^{=0}$; $const' = 0$

$$\frac{d}{dt}\bar{L}^{(t)} - \frac{d\bar{L}}{dt} = \bar{0}$$

$$\bar{M}_z(t) - |\bar{M}| = 0 \qquad |\bar{M}| = \bar{M}_z(t)$$

$$|\bar{M}| = \left(J + I(t)\right)\bar{B} = \bar{M}_z(t)$$

$$M_z(T) = M = IB$$

$$I''(T) = I = m\bar{R}^2$$

$$|\bar{M}| = \left(J + I\right)\bar{B} = I\bar{B'}, \quad \bar{B'} = [\bar{B} \times (-\bar{j})]J = -[\bar{B}\times\bar{j}]$$

$$\bar{B} = \frac{I}{J+J}\bar{B'} \Longrightarrow |\bar{w}| = \frac{-I}{J+I}\delta\bar{w}', \quad \boxed{\delta w = \frac{I}{J+I}\delta w}$$

№3.

$M = 0,33$ кг

$\ell = 1$ м

$m = 3$г $= 0,003$ кг

x

$\vartheta_0 = 250$ м/с

$\underline{v = 140 \text{ м/с}}$

$w(x) = ?$ По закону энергии

$E_{\kappa_0} = \Delta E_\kappa + E_\kappa'$

$\dfrac{m \vartheta_0^2}{2} = \Delta E_\kappa + \dfrac{m \vartheta^2}{2} \Rightarrow \Delta E_\kappa = \dfrac{m}{2}\left(\vartheta_0^2 - v^2\right)$

$I = I_{стерж}(M, \ell) = \dfrac{M\ell^2}{12}$ $\Delta E_\kappa = \dfrac{\Sigma I w^2}{2} = \dfrac{(I + J)w^2}{2}$

$J \overset{L}{=} I_{точеч}(m, x) = mx^2$ $\dfrac{m}{2}\left(v_0^2 - v^2\right) = \dfrac{(I + J)}{2}w^2$

$w = \sqrt{\dfrac{m \cdot \left(\vartheta_0^2 - \vartheta^2\right)}{I + J}} = \sqrt{\dfrac{m\left(v_0^2 - J^2\right)}{\dfrac{M\ell^2}{12} + mx^2}}$

Ответ: $w(x) = \sqrt{\dfrac{m\left(v_0^2 - v^2\right)}{\dfrac{M\ell^2}{12} + mx^2}}$

$y = \sqrt{\dfrac{m\left(v_0^2 - v^2\right)}{\dfrac{M\ell^2}{12} + mx^2}}$ $\{\ 0 \le x \le 0,5\ \}$

$m = 0,003$

$v_0 = 250$

$v = 140$

$M = 0,33$

$\ell = 1$

Сканировано с CamScanner