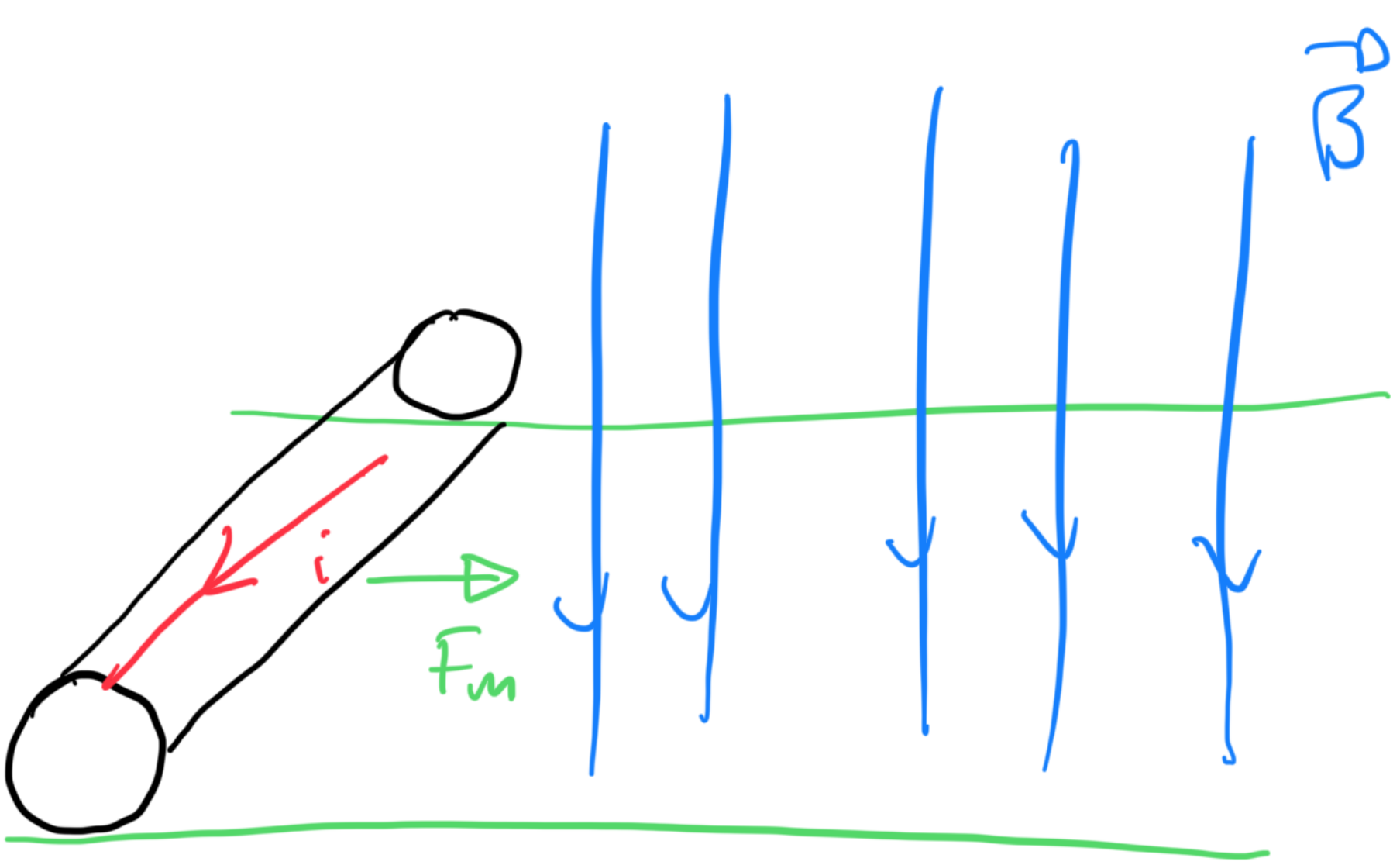

1. $\vec{F}_m = i\vec{L} \times \vec{B} \Rightarrow |\vec{F}_m| = idB\sin\theta$

$= idB$

$|\vec{F}_m| = (60.0)(0.12)(0.210)$

$= 1.512\ N$

2. How much work is done?

$W = \int \vec{F} \cdot dx = F_m \cdot L$

$= (1.512)(0.43)$

$= 0.6502\ J$

3. Where does this work go?

① linear kinetic energy $\frac{1}{2}mv^2$

② rotational kinetic energy $\frac{1}{2}I\omega^2$

What is I? $I = \frac{1}{2}mr^2$

What is ω? $\omega = \frac{v}{r}$

$$R.E. = \frac{1}{2}\left(\frac{1}{2}mr^2\right)\left(\frac{v^2}{r^2}\right)$$

$$= \frac{1}{4}mv^2$$

$$\therefore E_{TOTAL} = \frac{1}{2}mv^2 + \frac{1}{4}mv^2 = \frac{3}{4}mv^2$$

$$\frac{3}{4}mv^2 = 0.6502$$

$$v^2 = \frac{0.6502 \cdot 4}{3m}$$

$$\sqrt{\quad}$$

$$V = \frac{(0.6502)(4)}{(3)(0.72)}$$

$$= 1.10 \text{ m/s}$$