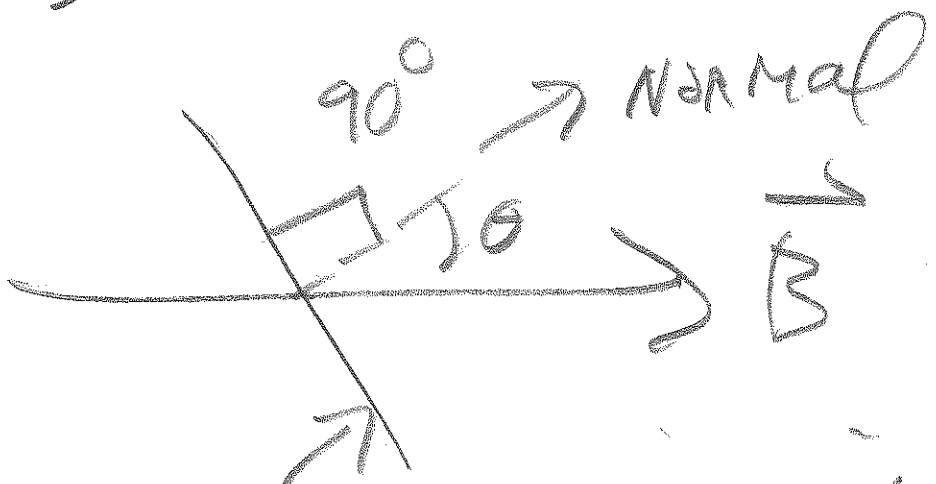
4B 4-7-14

B-field



area A (side view)

$$\oint \vec{B} \cdot d\vec{A} = 0$$

Force $q\vec{v} \times \vec{B}$ (ch 27)

15, 22, 29, 27

crossed $\vec{E}$ & $\vec{B}$ ($\vec{v}$-selector)

30.

Force on wire: 41, 42, 43, 69, 70, 74, 75; Torque: 46, 47, 79 Dc motor → 50 Hall eff. → 53, 54.

Tests

Quiz 7 (Ch 27)

* done in lecture

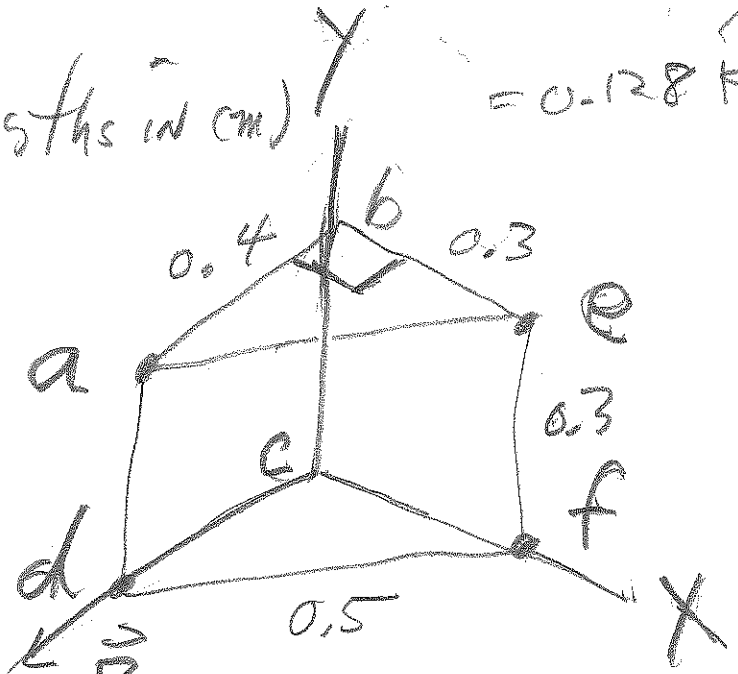
Forces

1, 8*

flux

14*

lengths in (m)



(c) Φ_{aefd}

$= \Phi_{aefd}$

$= (0.128) \cdot A \cdot \cos\theta$

$= B \cdot A \cdot \cos 53$

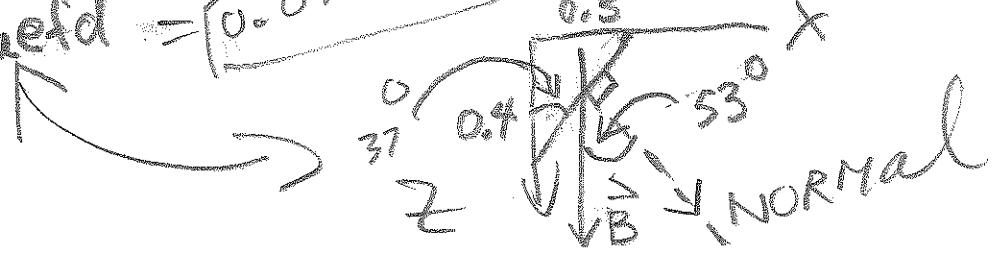
$A = (0.3)(0.5)\,m^2 = 0.15\,m^2$

$\Phi_{aefd} = (0.128)(0.15)\cos 53 = 0.012\ T \cdot m^2$

(a) $\Phi_{abcd} = 0$

(b) $\Phi_{befc} = -0.012\ T \cdot m^2$

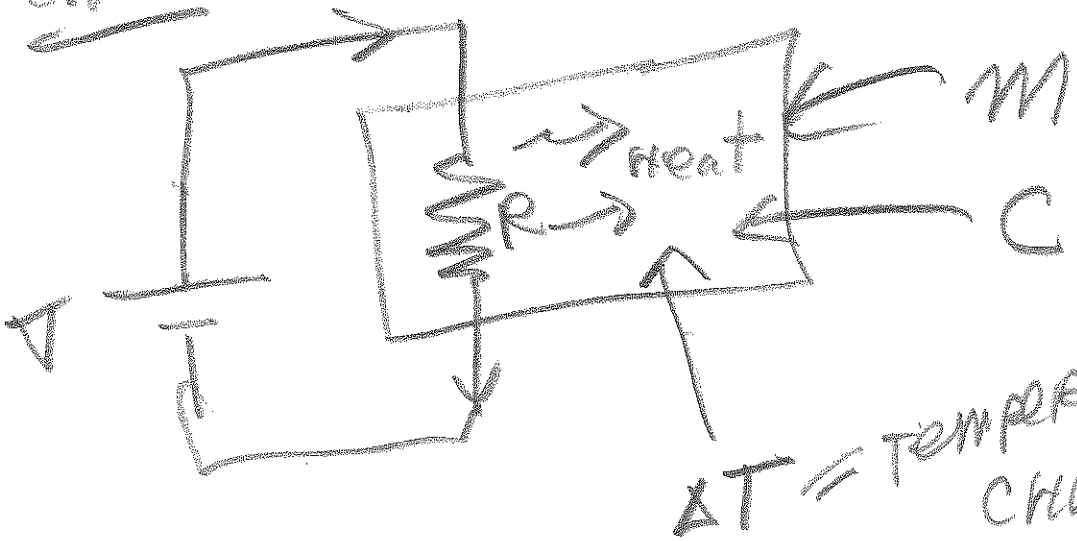
(d) $\Phi_{NET} = 0$



Sample T3

page one, # 3

Ch25



$$\frac{V^2}{R} \cdot \Delta t = mc \cdot \Delta T = \text{heat}$$

$\frac{J}{s}$ s J

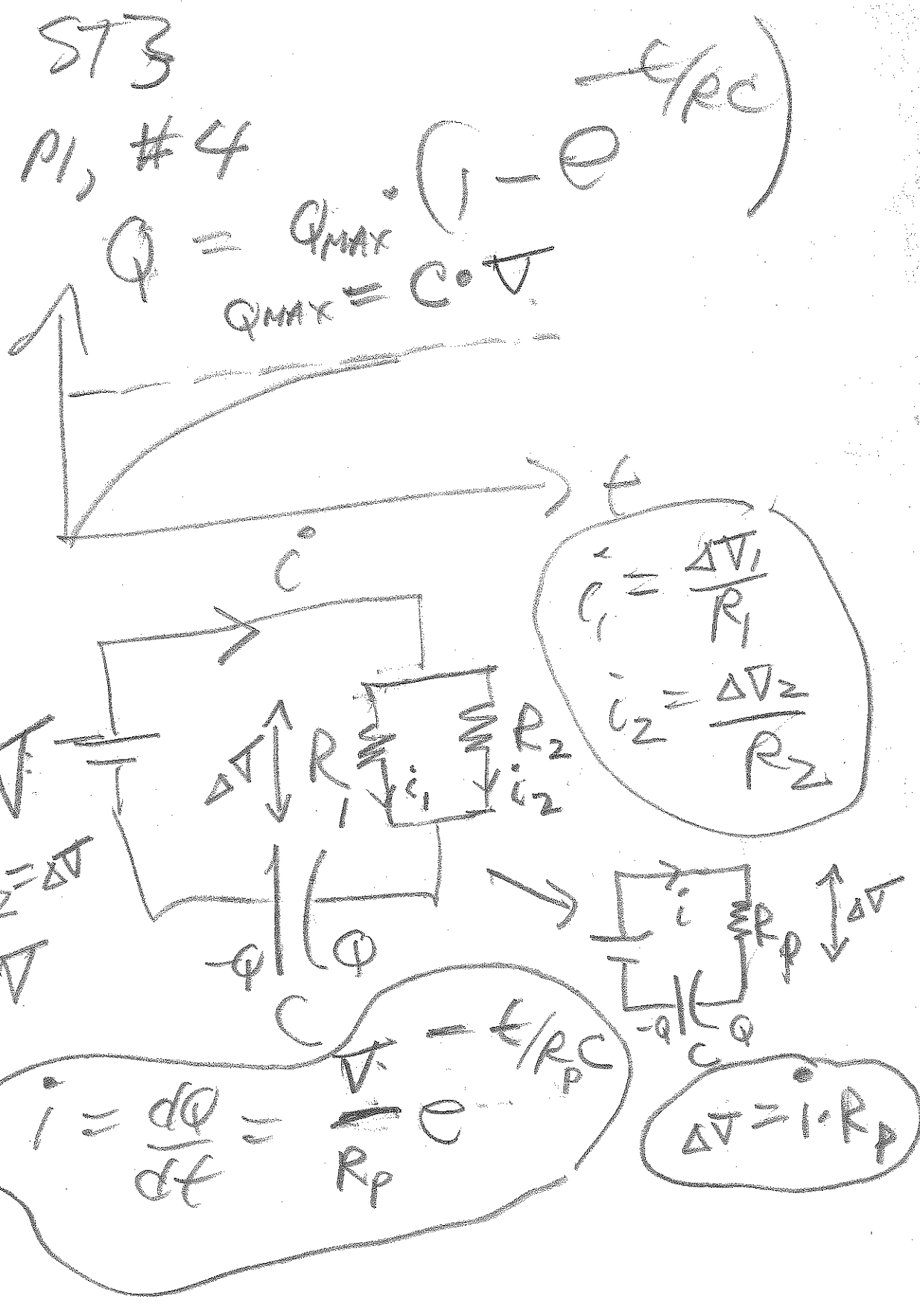
FIND R.

STS

P1, #4

$Q = Q_{MAX} \cdot \left(1 - e^{-t/RC}\right)$

$Q_{MAX} = C \cdot \mathcal{V}$



$$R_p = \frac{(4)(2)}{6} = \frac{8}{6} = \frac{4}{3}\,\Omega$$

$$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{2} \qquad = 1.333\,\Omega$$

$$i = \frac{12}{4/3} \cdot e^{-t/\left(\frac{4}{3}\cdot 10^{-6}\right)}$$

$$i = 9 \cdot e^{-\frac{3}{4}\times 10^{6} \cdot t}$$

$$i_1 = \frac{9 \cdot e^{-3/4\,10^{6} t} \cdot \frac{4}{3}}{4}$$

$$\dot{\varepsilon}_2 = \frac{9 \cdot e^{-\frac{3}{4}10\varepsilon} \cdot \frac{4}{3}}{2}$$

Let: $\varepsilon = 9.5 \times 10^{-6}$

$$\Rightarrow -\frac{3}{4} \cdot 10^6 \cdot 9.5 \times 10^{-6}$$

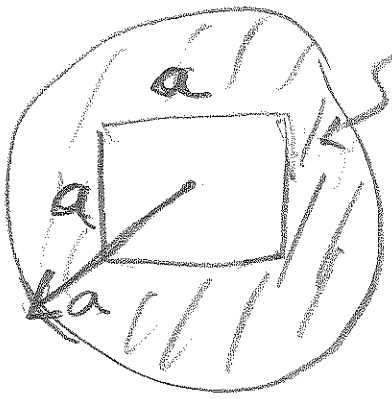
$$= -\frac{28.5}{4} = -7.1$$

$$\dot{\varepsilon}_1 = \frac{9e^{-7.1} \cdot 4/3}{4} = 3 \cdot e^{-7.1}$$

$$\dot{\varepsilon}_2 = \frac{9 \cdot e^{-7.1} \cdot \frac{4}{3}}{2} = 6e^{-7.1}$$

T3

PAGE TWO (#3)



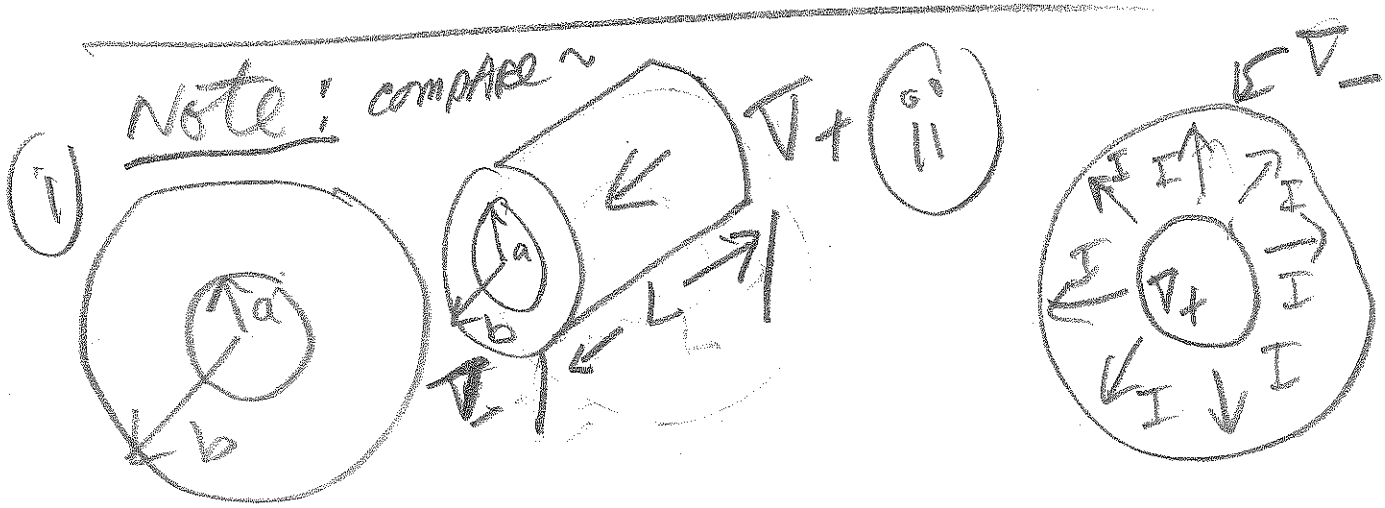
$$A = \pi a^2 - a^2$$

$$A = a^2(\pi - 1)$$

$$A \cong 2.14a^2$$

$$R = \frac{\rho L}{A}$$

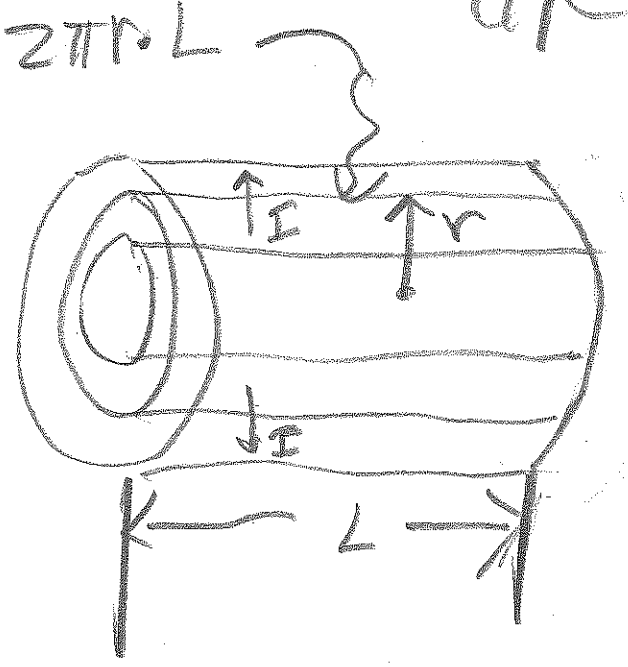
Note: compare ~



(i) $R = \dfrac{\rho L}{\pi(b^2 - a^2)}$

(ii) Integrate:

$$dR = \frac{\rho\, dr}{2\pi \cdot r \cdot L}$$



$$R = \frac{\rho}{2\pi L}\int_a^b \frac{dr}{r}$$

$$= \left(\frac{\rho}{2\pi L} \ln \frac{b}{a}\right)$$

14

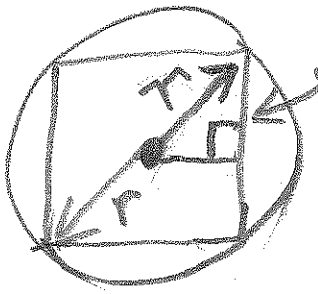
page one #2:

$$R = \frac{\rho L}{A}$$

$$A = \pi r^2 - \left(\frac{2r}{\sqrt{2}}\right)^2 = \pi r^2 - 2r^2$$

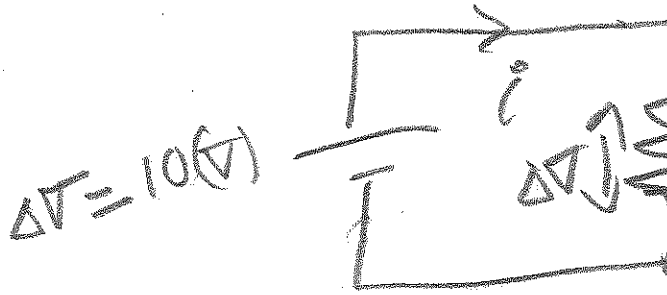
$$= r^2(\pi - 2)$$

$$r = \frac{d}{2}$$



page one #3: $i = \frac{10}{2.57}$ (A)

$= 3.89$ (A)



Heat rate $= \frac{V_2^2}{R_2} = \frac{i^2 \cdot R_2^2}{R_2}$

$$\frac{3.89^2 \cdot 0.57^2}{2} = 2.46 \frac{J}{s}$$

(10)

$$2.46 = \frac{1000}{time}$$

$$time = \frac{1000}{2.46} = 407$$

ST 4 page 2:

(#3) see previous problem

(#2) see previous problems:

$$I\Delta V \cdot t = mL_f + mc\Delta T$$

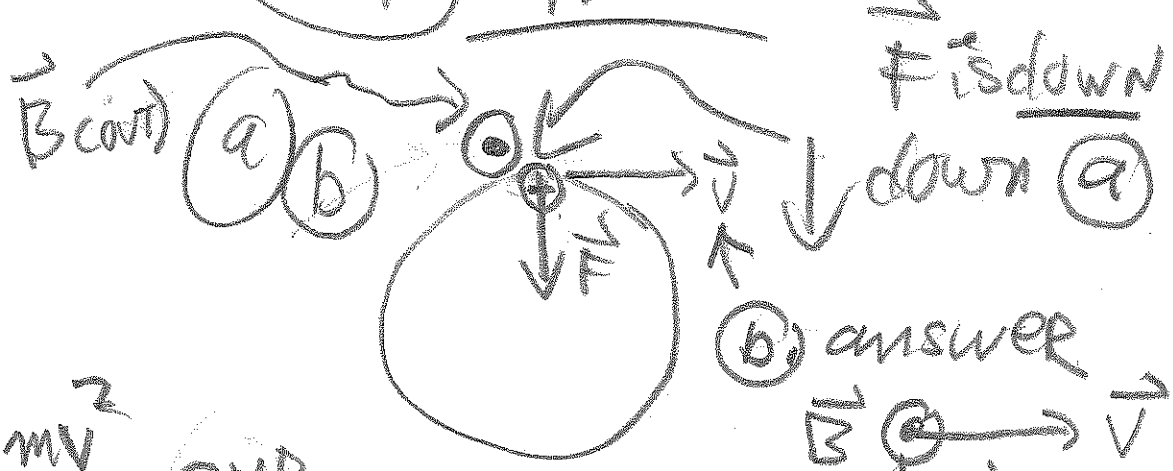
sample final

MAG1 # 2:

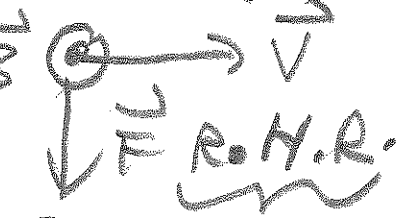
set R.

(#3) already done.

(#4) CH27



(b) answer



R.H.R.

RIGHT HAND Rule.

(c) $\frac{mv^2}{r} = qvB$

$r = \frac{mv}{qB} = \frac{(10^{-26})v^*}{(10^{-19})(1)} = 10 \cdot 1.4 \times 10^{-7} = \boxed{0.014\,m}$

$\frac{1}{2}mv^2 = q \cdot V \rightarrow v = \sqrt{\frac{2 \cdot 10^{-19} \cdot 10^3}{10^{-26}}} = 1.4 \times 10^5 \frac{m}{s}$ *