

Phys Discussion 21

a) $F_B = qv \times B$ $I = \frac{q}{t} = \frac{qv}{L} \rightarrow qv = IL$

$\therefore F_B = I\vec{L} \times \vec{B}$ ~~$I\vec{L} \times \vec{B}$~~ $F_B = ILB \sin \theta$

a) $F_B = ILB = Iab$ down d) $\vec{F}_B = Iab$ up
 b) $F_B = 0$
 c) $F_B = 0$

b) $F_{net} = 0$

c) $M = I\vec{A} = Iab$ down

d) ~~$\tau = 2Fd = IL^2 B \sin \theta = \vec{M} \times \vec{B} = MB \sin \theta$~~
 $\tau_g = r \times F_g$ $r = \frac{b}{2} \cdot Mg = \frac{mgb}{2}$

e) $\tau_B = \vec{M} \times \vec{B} = IabB$

f) ~~$F_B = F_g$~~ ~~$qv \times B = mg$~~

~~$\tau_B = \tau_g$~~ $\tau_B = \tau_g \therefore \frac{mgb}{2} = IabB \therefore B = \frac{mg}{Ia2}$