1° EXERCISE

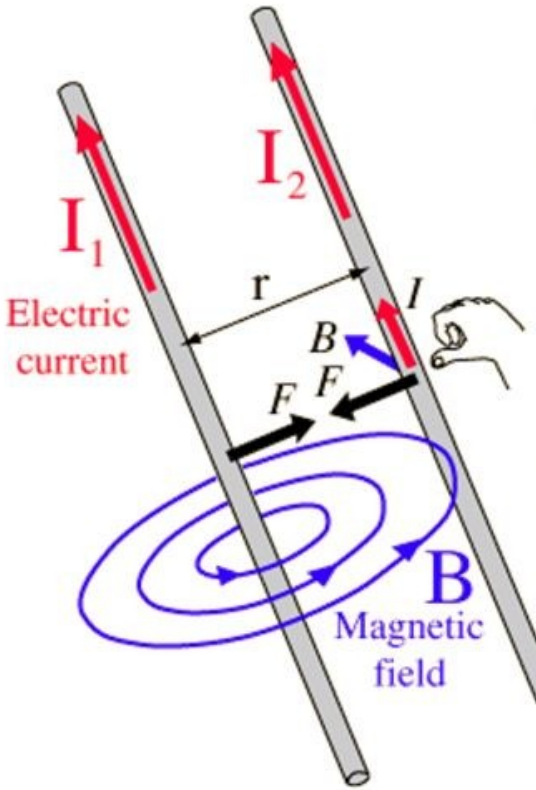
- Two long straight , parallel wires, 12.5 cm apart, carry current of equal magnitude “I”.

They repel each other with a force per unit length of $7.6*10^{-9}$ N/m.

Are the currents parallel or anti parallel. Find “I”.

S_1° The current are antiparallel

Forza magnetica tra due fili percorsi da corrente



Magnetic field at wire 2 from current in wire 1:

$$B = \frac{\mu_0 I_1}{2\pi r}$$

Force on a length ΔL of wire 2:

$$F = I_2 \Delta L B$$

Force per unit length in terms of the currents:

$$\frac{F}{\Delta L} = \frac{\mu_0 I_1 I_2}{2\pi r}$$

2° EXERCISE

- A wire of length 22cm floats 1.5mm above a long straight wire.
- The same current flows in both wire.
- If the mass of the 22cm wire is 8g, what is the current?

S_2° F = P

- $F = k\frac{i_1 i_2 l}{d}$ = m*g

3° EXERCISE

- A 32cm straight, horizontal wire of mass 80g is connected to a source of emf by flexible leads.
- A magnetic field of 2T is perpendicular to the wire.
- Find the current necessary to let the wire float.

- $F = I*L*B*\text{sen}(\theta) = m*g$
- $I = (m*g) / (L*B*\text{sen}(\theta)) =$

  $= (0.080*9.81) / (0.32*2*\text{sen}(90°))$

4° EXERCISE

- An electron moving with velocity “v” to the right enters a region of uniform magnetic field that point out of the page.
- After the electron enter this region, will it be deflected upward or downward?

- UPWARD

5° EXERCISE

- Find the maximum torque on a 100-turn square loop of a wire of 10.0 cm on a side that carries 15.0 A of current in a 2.00-T field.

- Strategy
- Torque on the loop can be found using
- $\tau = NIAB \sin\theta$. Maximum torque occurs when $\theta = 90o$ and $\sin\theta = 1$.
- Solution
- For
- $\sin\theta = 1$, the maximum torque is
- τ max = NIAB.
- τ max = (100)(15.0 A) /\ 0.100 m 2 \/ (2.00 T)
- Entering known values yields
- = 30.0 N · m.