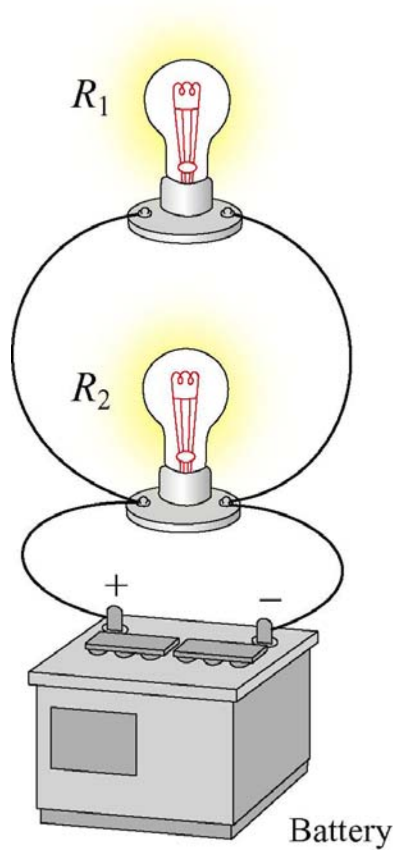
Bulbs and Batteries

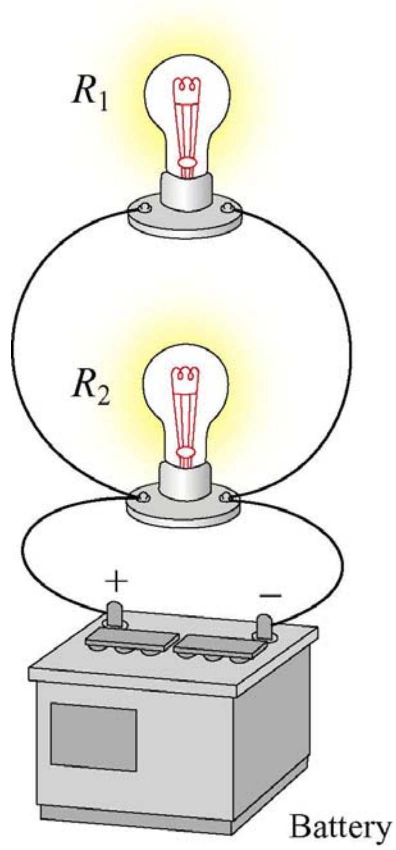
An ideal battery is hooked to a light bulb with wires. A second identical light bulb is connected in parallel to the first light bulb. After the second light bulb is connected, the current from the battery compared to when only one bulb was connected.



1. Is Higher
2. Is Lower
3. Is The Same
4. Don't know

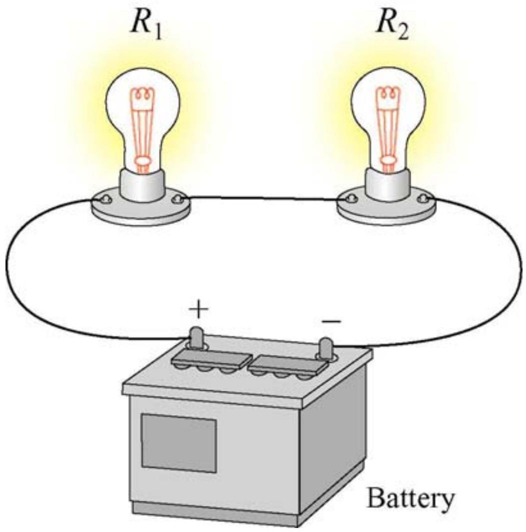
Bulbs and Batteries

An ideal battery is hooked to a light bulb with wires. A second identical light bulb is connected in parallel to the first light bulb. After the second light bulb is connected, the power output from the battery (compared to when only one bulb was connected)



1. Is four times higher
2. Is twice as high
3. Is the same
4. Is half as much
5. Is one quarter as much
6. Don't know

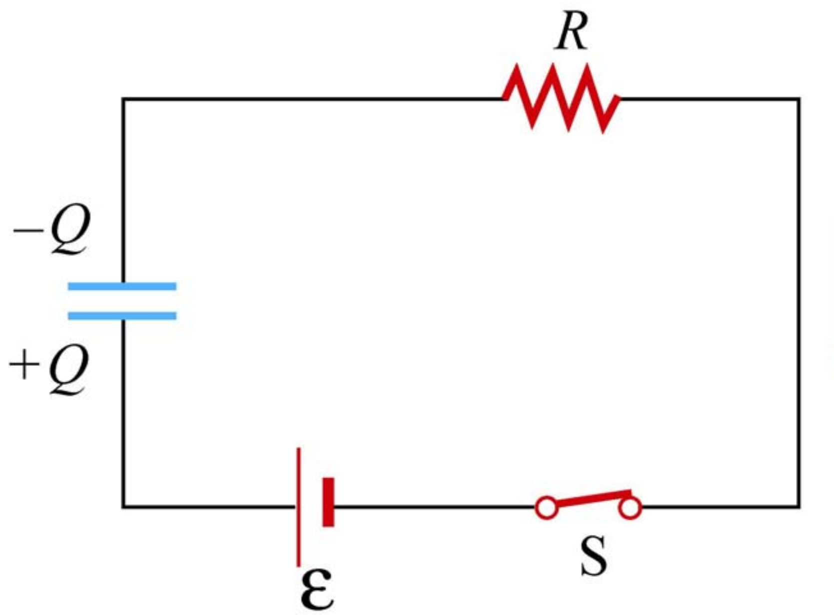
Bulbs and Batteries



An ideal battery is hooked to a light bulb with wires. A second identical light bulb is connected in series with the first light bulb. After the second light bulb is connected, the light from the first bulb (compared to when only one bulb was connected)

1. is four times as bright
2. is twice as bright
3. is the same
4. is half as bright
5. is one quarter as bright

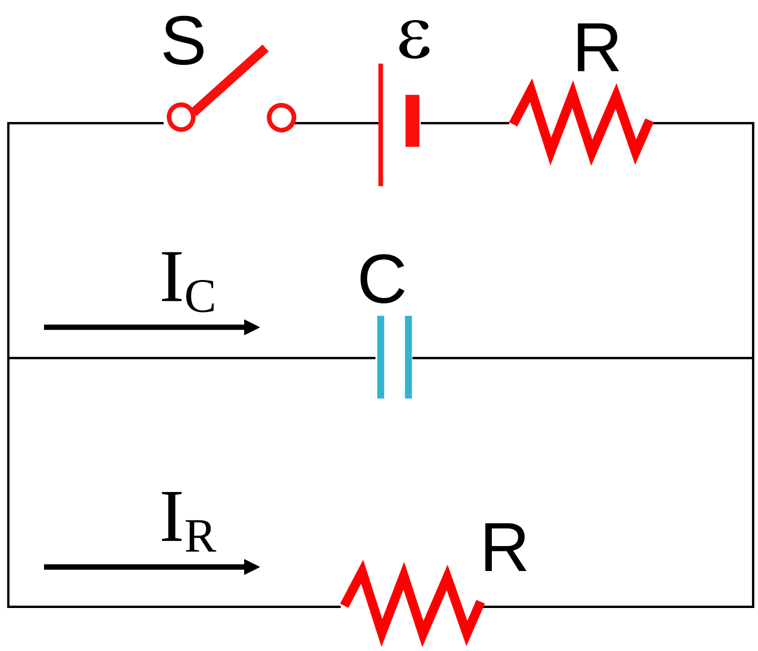
RC Circuit



An uncharged capacitor is connected to a dc voltage source via a switch. A resistor is placed in series with the capacitor. The switch is initially open. At t = 0, the switch is closed. A very long time after the switch is closed, the current in the circuit is

1. nearly zero
2. at a maximum and decreasing
3. nearly constant but non-zero

RC Circuit

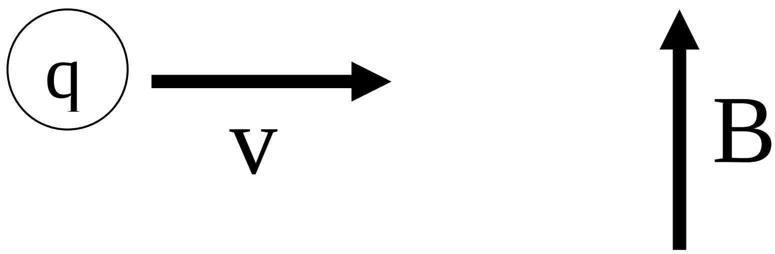


Consider the above circuit, with an initially uncharged capacitor and two identical resistors. At the instant the switch is closed:

1. $I_R = I_C = 0$
2. $I_R = I_C = \varepsilon/R$
3. $I_R = \varepsilon/2R$; $I_C = 0$
4. $I_R = 0$; $I_C = \varepsilon/R$
5. $I_R = \varepsilon/2R$; $I_C = \varepsilon/R$

Force on Charged Particle

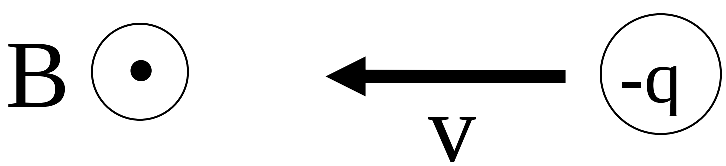
What direction is the force on a positive charge when entering a uniform B field in the direction indicated?



1) up
2) down
3) left
4) right
5) into page
6) out of page
7) there is no net force

Force on Charged Particle

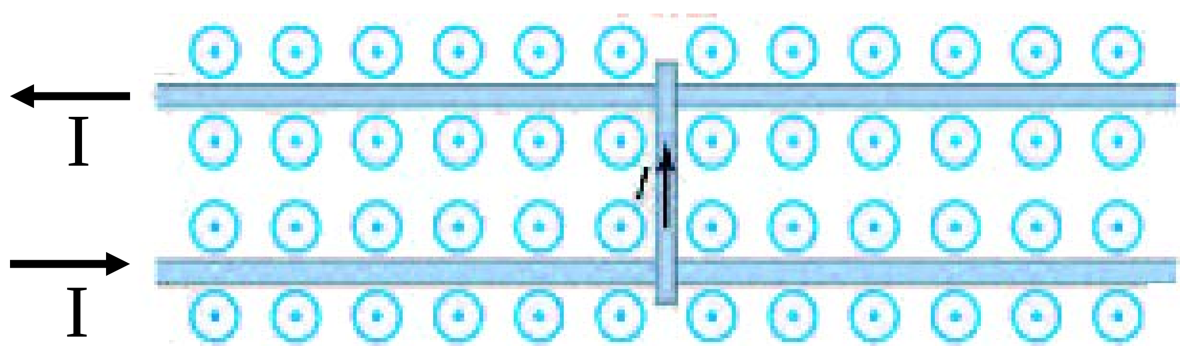
What direction is the force on a negative charge when entering a uniform B field in the direction indicated?



1) up
2) down
3) left
4) right
5) into page
6) out of page
7) there is no net force

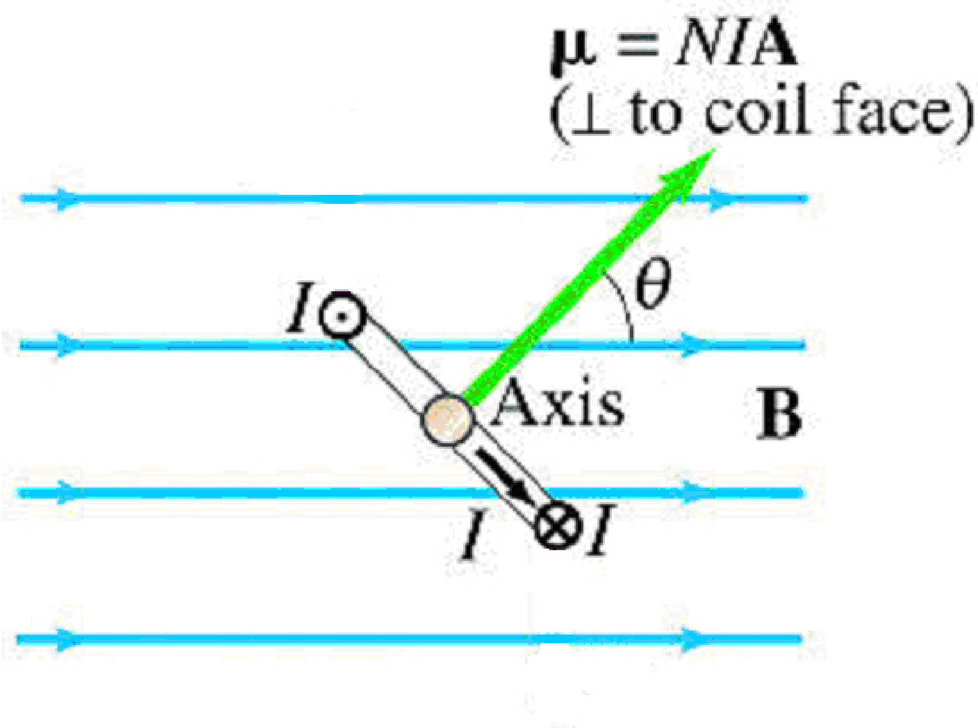
Rail Gun

A bar is free to slide on two parallel rails. A current I flows through the bar in the direction shown. An external magnetic field points out of the page. The bar in the center of the figure will:



1) move left
2) move right
3) stay in place

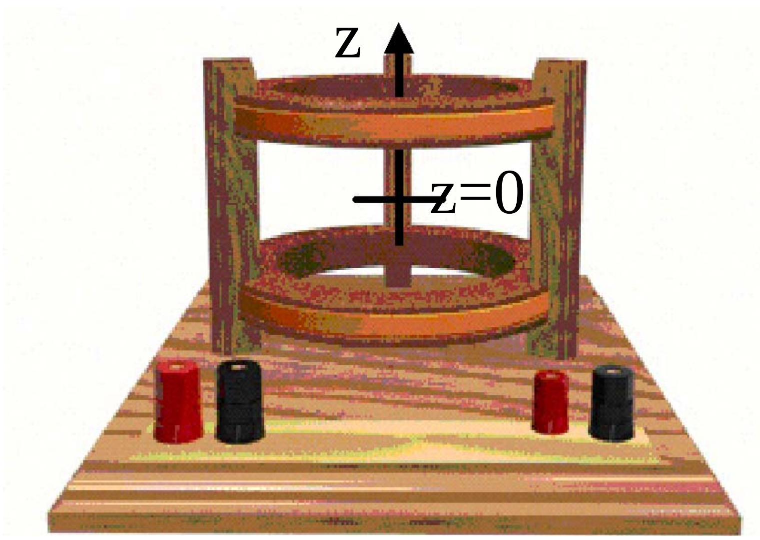
Dipole in Field



The coil above will rotate

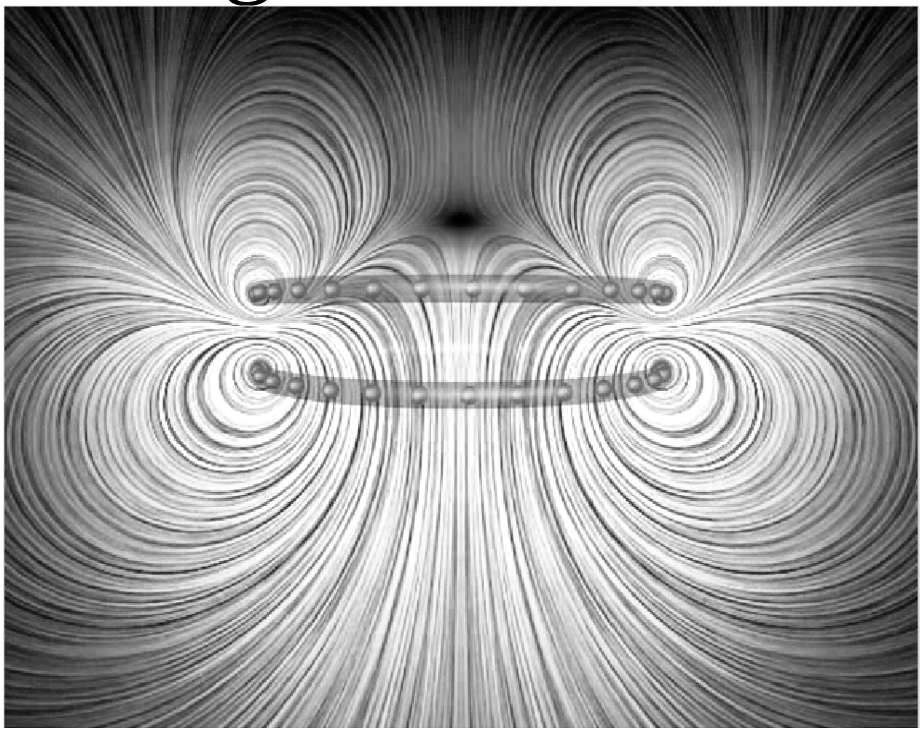
1. clockwise
2. counterclockwise
3. stay in the orientation shown because the total force is zero

A Helmholtz coil is hooked up with current running parallel in both coils. A magnetic dipole is placed along the z-axis at the point z = 0 with the magnetic moment pointing in the +x direction. Which of the following statements is true?



1. Force & torque on the dipole are zero
2. Force on the dipole is zero and torque on the dipole is non-zero
3. Force & torque on the dipole are nonzero
4. The force on the dipole is non-zero and the torque on the dipole is zero

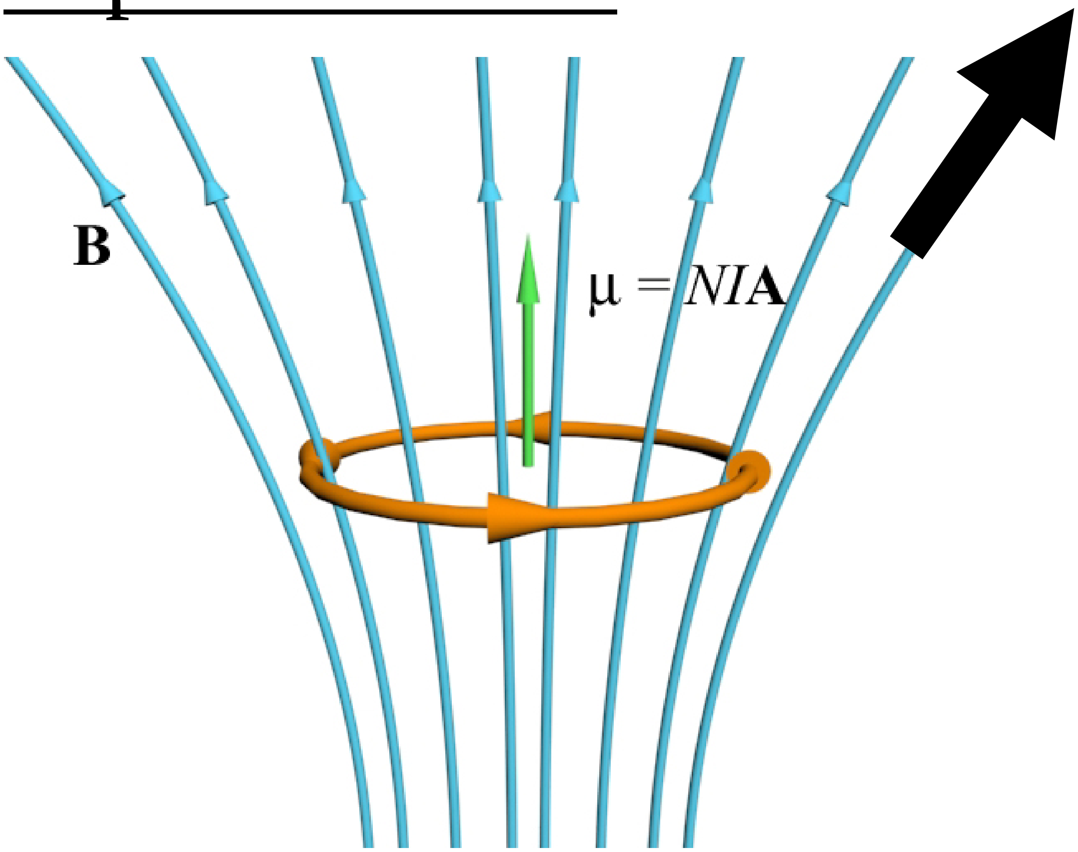
Iron Filings



Above is a iron filings representation of the magnetic field created by two loops of current. Which is true?

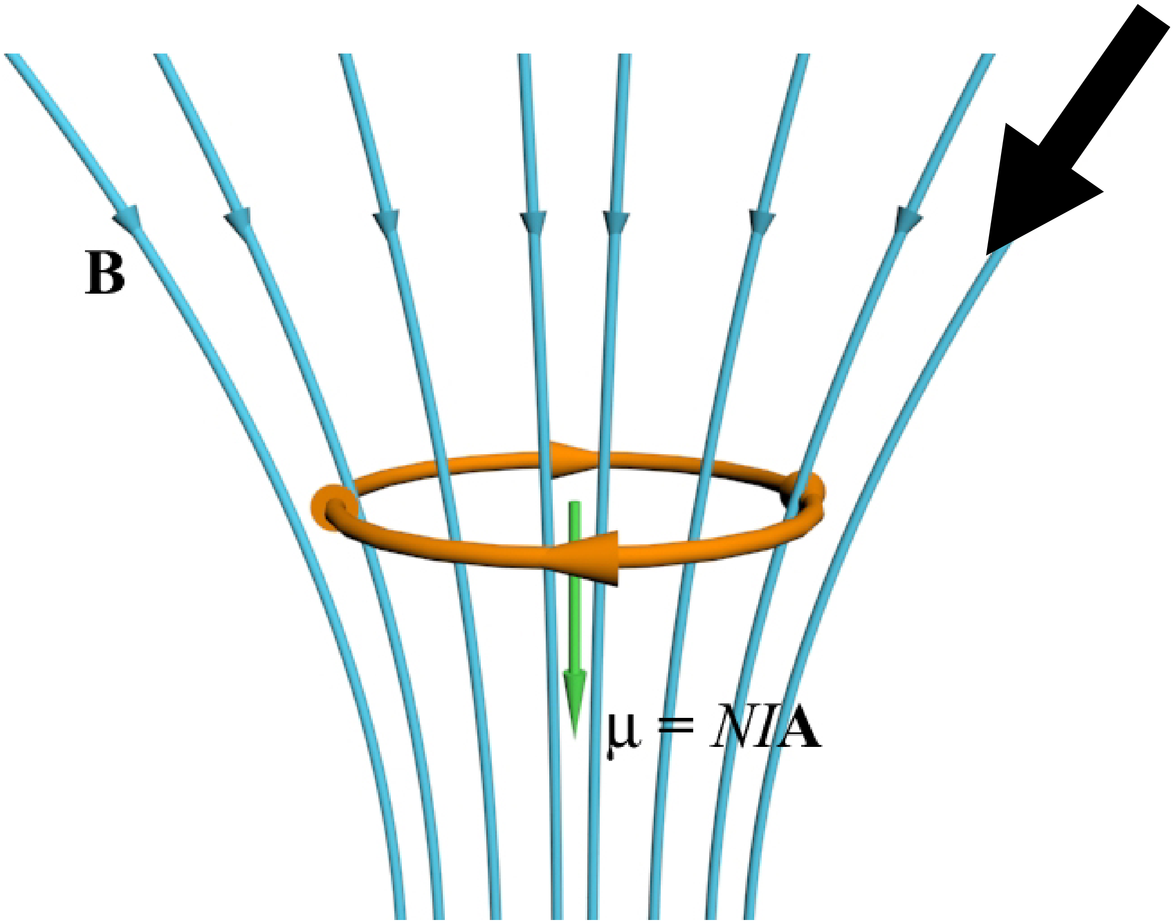
1. Currents are parallel (bigger in top); loops attracted
2. Currents are parallel (bigger in bottom); loops repelled
3. Currents are anti-parallel (bigger in bottom); loops attracted
4. Currents are anti-parallel (bigger in top); loops repelled
5. None of the above

Dipole in Field



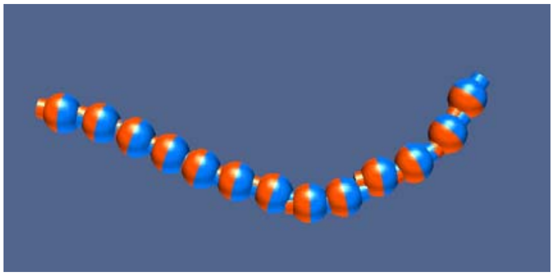
The current carrying coil above will move

1. upwards
2. downwards
3. stay where it is because the total force is zero



The current-carrying coil above will move

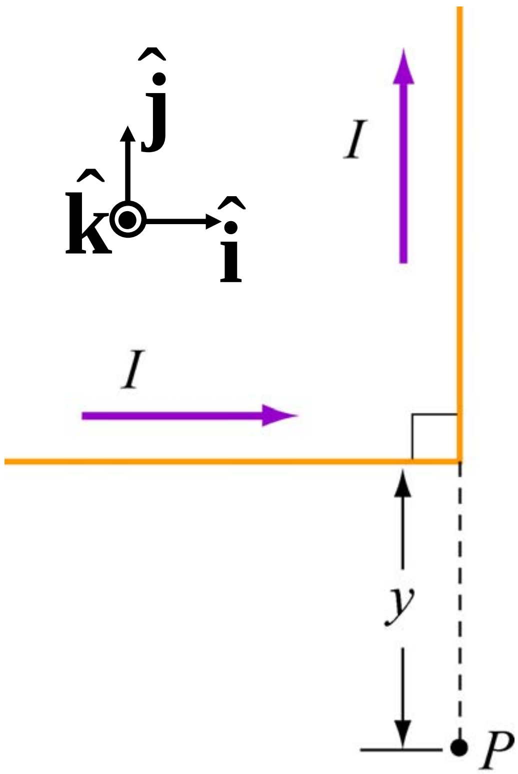
1. upwards
2. downwards
3. stay where it is because the total force is zero



Free dipoles attract because:

1. The force between dipoles is always attractive independent of orientation.
2. A dipole will always move towards stronger field, independent of orientation.
3. The torque on the dipole aligns it with the local field and the dipole will then move toward stronger field strength.

Bent Wire



The magnetic field at point P

1. points towards the +x direction
2. points towards the +y direction
3. points towards the +z direction
4. points towards the -x direction
5. points towards the -y direction
6. points towards the -z direction
7. points nowhere because it is zero