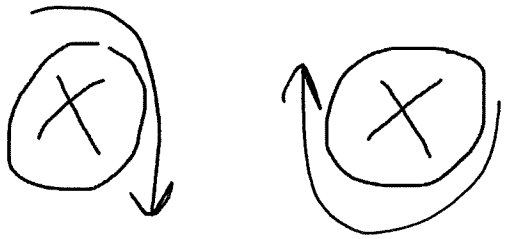
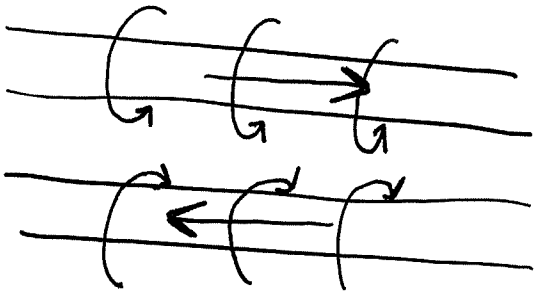
1. Two parallel wires have current moving as shown, will the wires push each other apart or pull together?



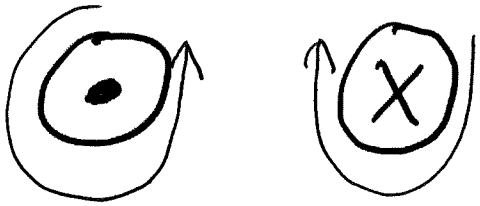
Fields are in opposite directions so they pull together

2. Two wires have current moving as shown, will the wires push each other apart or pull each other together?



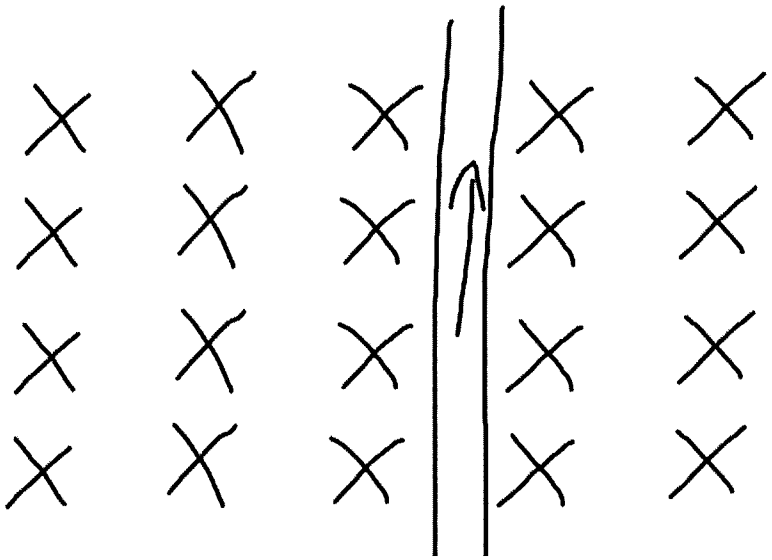
Fields are both in same direction so they repel

3. Two wires have current moving as shown, will the wires push each other apart or pull each other together?



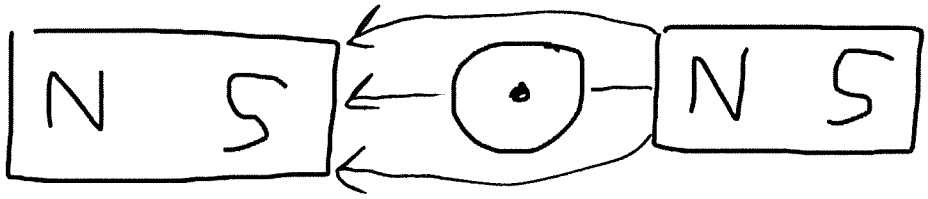
Fields are in same direction so they repel

4. Which direction will the wire shown be pushed due to the magnetic field pushing into the page?



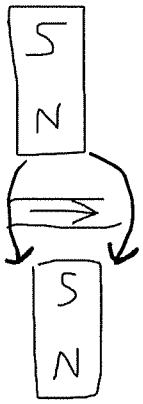
To the left

5. Which direction will the wire be pushed by the magnetic field created by the two permanent magnets shown.



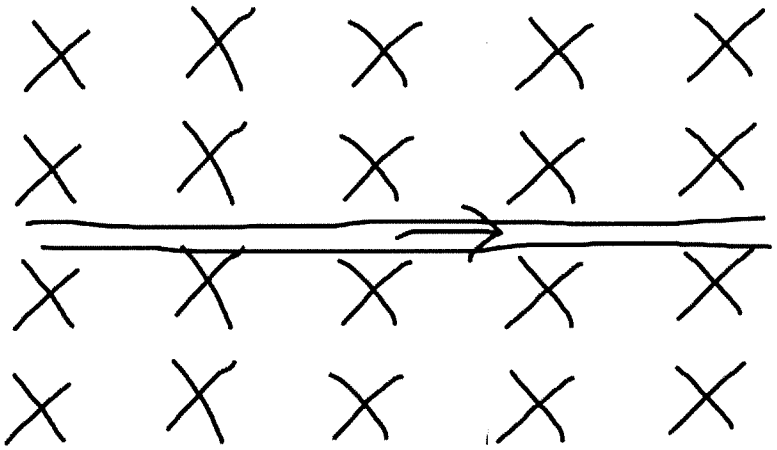
Down the page

6. Determine the direction the wire shown will be pushed due to the magnetic field between the two permanent magnets shown.



Into the page

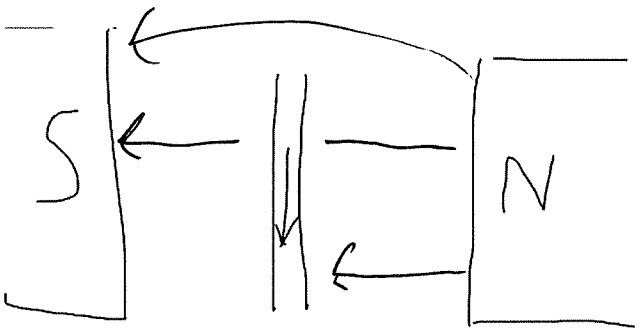
7. Determine the direction the wire shown will be pushed due the magnetic field pushing into the page?



Up the page

8. A current carrying wire is placed between two permanent magnets and rotated. Determine the magnitude of the magnetic force acting on the wire at each position if the strength of the magnetic field is 0.0125 T, 0.12 metres of wire is in the magnetic field, and 2.0 A of current is flowing.

a.

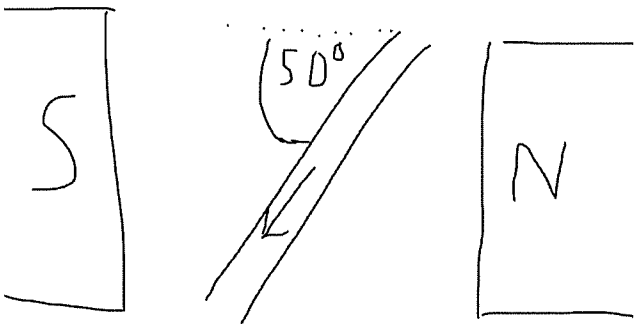


Current is pependicular to field

$F_M = BIl = (0.0125T)(2.0)(0.12)$

$= 0.0030\ N$

b.

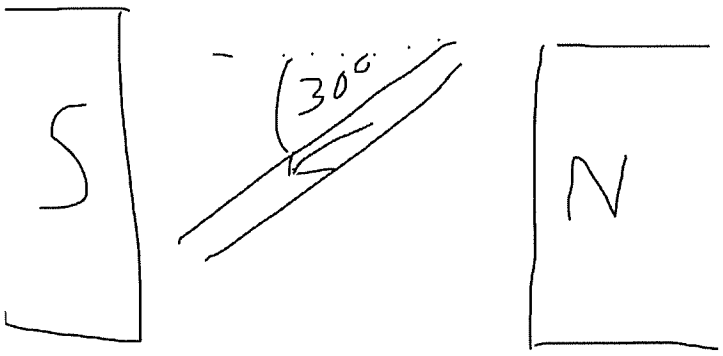


Current is at 50° angle to field

$F_M = BIl \sin 50°$

$= 0.0023\ N$

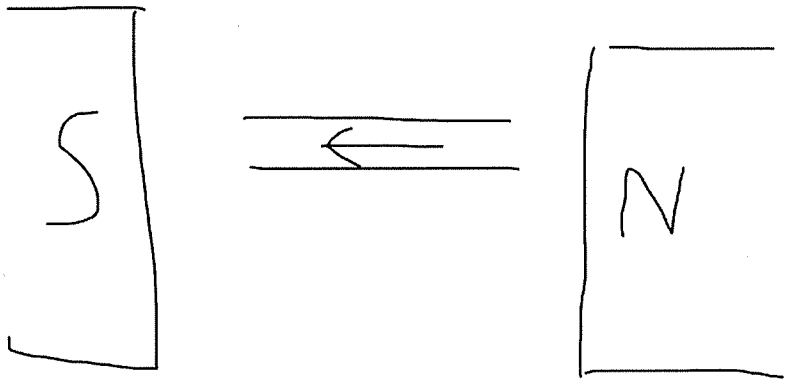
c.



Current is at 30° angle to field

$F_M = 0.0015\ N$

d.



Current is parallel to field

$F_M = BIl \sin\theta$

$= 0\ N$

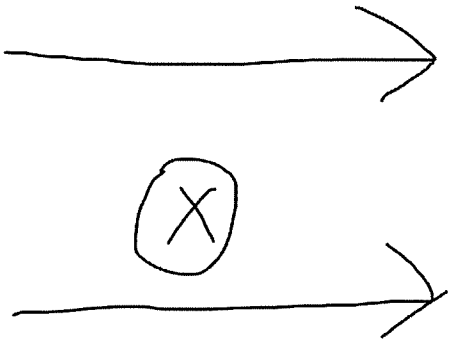
e. In all of the above questions which direction was the magnetic force pushing the wire?

Into the page

9. 0.89 metres of wire with 2.4 A of current flowing through it is perpendicular to a 0.0056 T magnetic field. What is the magnitude of the magnetic force acting on the wire?

$$F_M = BIl = (0.0056) \times (2.4) \times (0.89$$
$$= 0.012\,N$$

10. The wire shown below has 4.2 A of current flowing through it and the magnetic field going from left to right is of strength 0.0912 T. 1.4 metres of wire is exposed to the magnetic field.



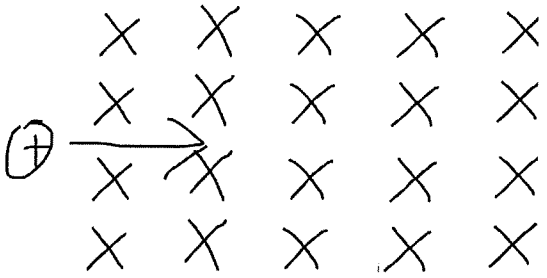
a. What direction is the force acting on the wire?

Down the page

b. What is the magnitude of the force acting on the wire?

$$F_M = BIl = (0.0912)(4.2)(1.4)$$
$$= 0.54\,N$$

11. A positively charged object is moving from left to right across a magnetic field directed into the page.



a. Which direction will it be deflected?

Use RHR

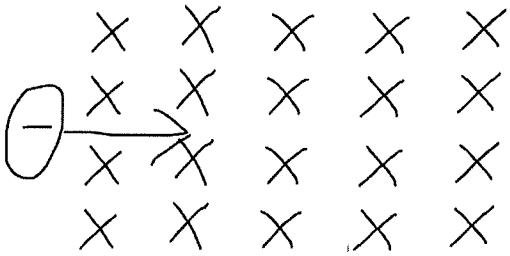
Up the page

b. If the charge is $23\mu C$ and it is moving at 560 m/s, and the magnetic field strength is 0.23T what will be the force acting on the charge?

$F_M = Bqv = (0.23)(23\times10^{-6})(560)$

$= 0.0030\ N$

12. A negatively charged object is moving from left to right across a magnetic field directed into the page.



a. Which direction will it be deflected?

Use left hand rule

Down the page

b. If the charge is $-4.2\mu C$ and it is moving at 4.25×10^7 m/s, and the magnetic field strength is 0.63T what will be the force acting on the charge?

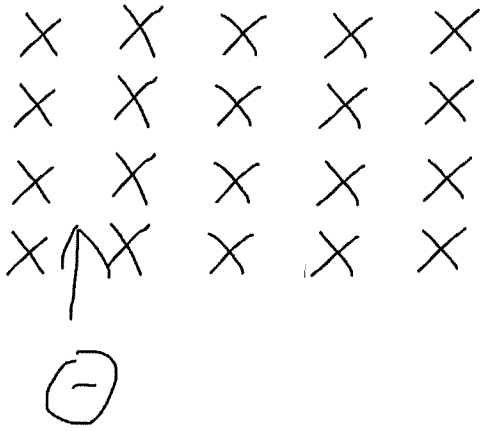
$F_M = Bqv = (0.63)(4.2\times10^{-6})(4.25\times10^{7})$

use positive

$= 1125$

$\approx 1100\ N$

13. A negatively charged particle is initially moving relatively slowly to the North in a magnetic field directed into the page as shown.



a. Which direction will the magnetic force push the particle?

Use left hand rule

→ to the right or East

b. Once the particle accelerates in the direction from a) that direction quickly becomes the most important velocity, what direction will the particle be pushed now?

Since it is now moving East it is pushed south

c. As a result of the push in b the object has started moving in a new direction, what direction will the magnetic force push the particle now?

It will be pushed West and the force will start pushing it North once it is moving in that direction

d. Will a particle allowed to move freely in a magnetic field like this move in a circular path?

Yes