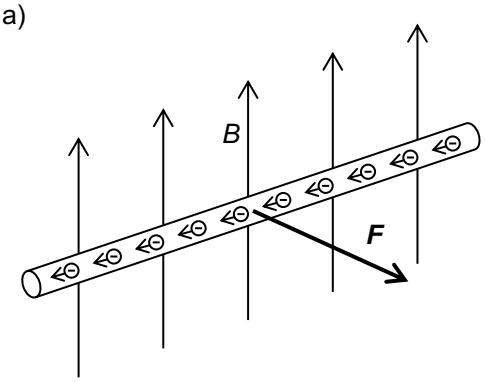
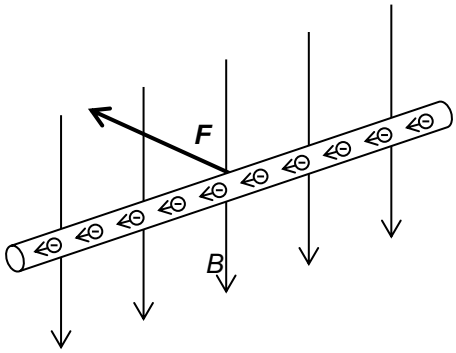
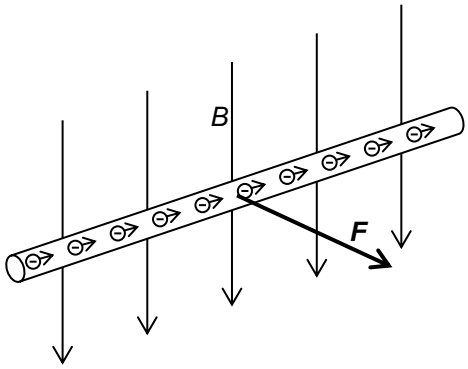
1. a)



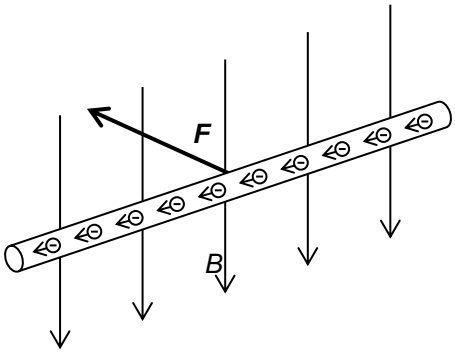
b)



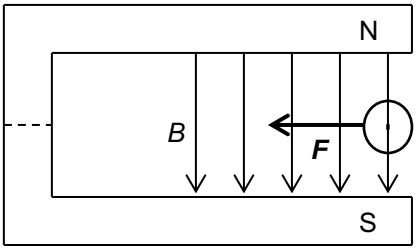
c)



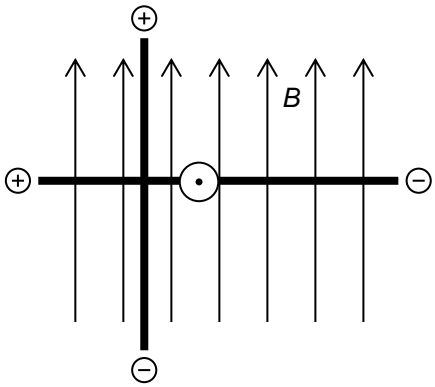
d)



2.

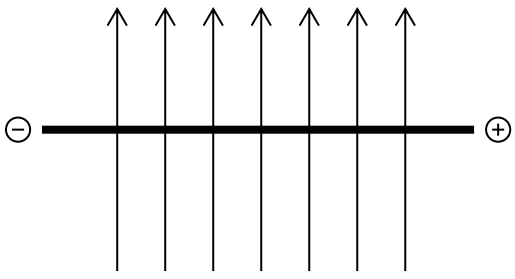


3. a)

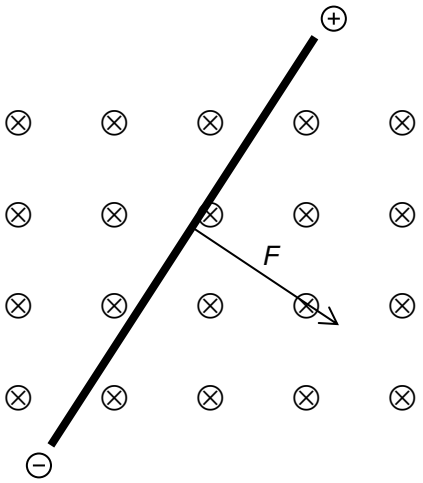


Electrons moving in a wire parallel to the magnetic field lines do not experience a magnetic force.

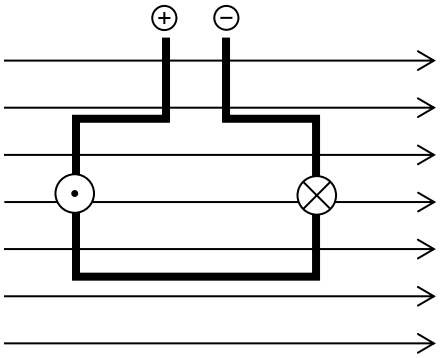
b)



c)

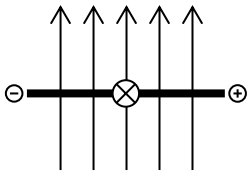


d)



Electrons moving in the piece of wire parallel to the magnetic field lines do not experience a magnetic force

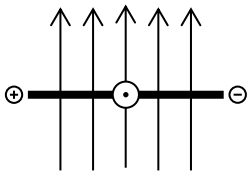
4. a)



$F = I \cdot B \cdot s = 3.5\ \text{A} \cdot 0.05\ \text{T} \cdot 0.09\ \text{m} = 0.0158\ \text{N} = \underline{16\ \text{mN}}$

b) The magnetic force is zero, because the electrons in the wire are moving parallel to the magnetic field lines.

c)

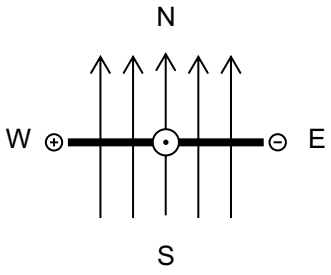


$F = I \cdot B \cdot s = 33 \cdot 10^{-6}\ \text{A} \cdot 33 \cdot 10^{-6}\ \text{T} \cdot 33 \cdot 10^{3}\ \text{m} = \underline{3.6 \cdot 10^{-5}\ \text{N}}$

5. $I = \dfrac{F_{\text{magnetic}}}{B \cdot s} = \dfrac{0.200\ \text{N}}{0.500\ \text{T} \cdot 0.0400\ \text{m}} = \underline{10.0\ \text{A}}$

6. a) $F = I \cdot B \cdot s = 4'400\ \text{A} \cdot 14.2 \cdot 10^{-6}\ \text{T} \cdot 65\ \text{m} = \underline{4.1\ \text{N}}$

b)



Top view. The geografic north pole of the Earth is a magnetic south pole.
The wire is lifted slightly upwards.

7. $B = \dfrac{F_{\text{magnetic}}}{I \cdot s} = \dfrac{0.34\ \text{N}}{15.5\ \text{A} \cdot 0.037\ \text{m}} = \underline{0.59\ \text{T}}$