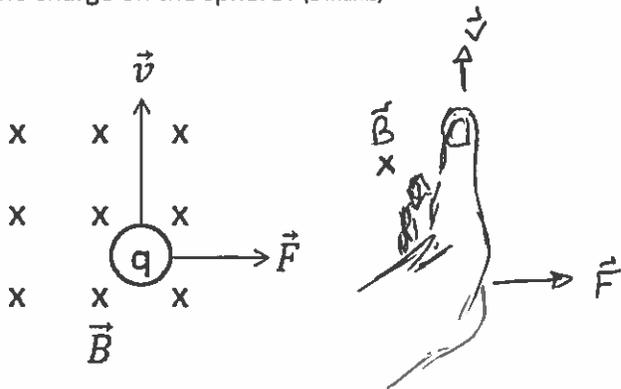


First Name: _____ Last Name: _____

1.15 - Formative Quiz - Motor Effect

Q1: In the diagram below, a sphere of unknown charge is moving upward at 3.0×10^4 m/s through a magnetic field of 2.5×10^2 Tesla. If it experiences a magnetic force of 2.4×10^{-12} N to the right, what is the charge on the sphere? (2 marks)



$$|\vec{F}_m| = qv_{\perp} |\vec{B}|$$

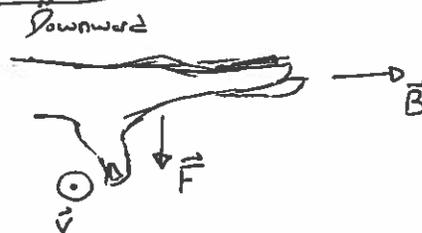
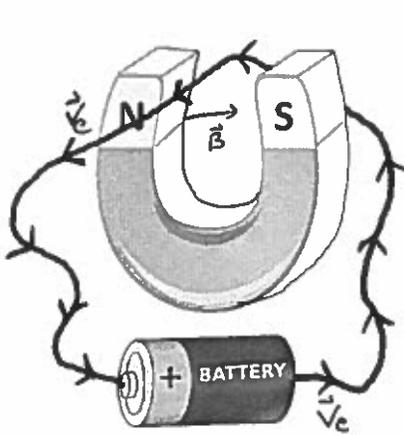
$$(2.4 \times 10^{-12} \text{ N}) = q(3.0 \times 10^4 \text{ m/s})(2.5 \times 10^2 \text{ T})$$

$$|q| = 3.2 \times 10^{-19} \text{ C}$$

Because left hand rule then negative charge.

$$\text{so } q = -3.2 \times 10^{-19} \text{ C}$$

Q2: A battery produces 6 mA of current. If 1.5 cm of wire is passed through a magnetic field of strength 1.3 Tesla, what is the magnitude and direction of the magnetic force on the wire? (2 marks)



Current comes out of negative terminal, so coming toward us when passing through magnetic field.

MARKING:

Beginning	0 - 1.5
Progressing	2 - 2.5
Competent	3 - 3.5
Exemplary	4

$$|\vec{F}_m| = qv_{\perp} |\vec{B}| \quad \text{or} \quad |\vec{F}_m| = IL |\vec{B}|$$

$$|\vec{F}_m| = (6 \times 10^{-3} \text{ A})(1.5 \times 10^{-2} \text{ m})(1.3 \text{ T})$$

$$= 1.17 \times 10^{-4} \text{ N}$$

$$\vec{F}_m = 1.17 \times 10^{-4} \text{ N [down]}$$