P3323 quiz6-2 September 28, 2016

1. A particle of charge q enters a region of uniform magnetic field **B** (pointing *into* the page). The field deflects the particle a distance d above the original line of flight as shown. Is the charge positive or negative?



- A) Positive
- B) Negative
- C) Not enough information

2. A rectangular loop of wire, supporting a mass m, hangs vertically with one end in t a uniform magnetic field **B**, which points *out* of the page in the shaded region of the figure. For what current I, in the loop, would the magnetic force upward exactly balance the gravitational force downward?



A)

$$I=-\frac{mg}{Ba}$$

B)

$$I = \frac{mgh}{Ba}$$

C)

$$I = \frac{mg}{Ba}$$

- 3. The continuity equation  $\nabla \cdot \mathbf{J} = -\frac{\partial \rho}{\partial t}$ , where  $\mathbf{J}$  is the current density and  $\rho$  is the charge density, is the mathematical statement of
  - A) local charge conservation
  - B) global charge conservation
  - C) conservation of momentum
  - D) conservation of energy

4. The magnetic force on a segment of current carrying wire is

A)  

$$\mathbf{F}_{mag} = \int I(d\mathbf{l} \times \mathbf{B})$$
B)

$$\mathbf{F}_{mag} = -\int I(d\mathbf{l} imes \mathbf{B})$$

C)

$$\mathbf{F}_{mag} = \int I(d\mathbf{l} \cdot \mathbf{B}) \hat{\mathbf{B}}$$