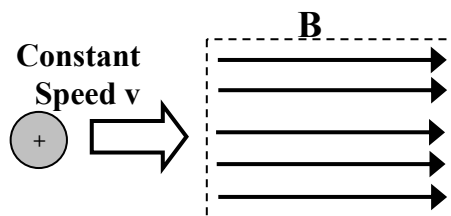


A sphere with positive charge and mass M , moves at constant speed towards the right. It enters a region with a *uniform magnetic field* \mathbf{B} (see figure above). For the following questions, indicate your choice by circling the corresponding letter, **a** to **e**.

- Q1.** When the sphere enters the magnetic field \mathbf{B} region, it will...
- (a) speed up in direction out of the page.
 - (b) change direction to align with the \mathbf{B} field and then move at constant speed in the direction of \mathbf{B} .
 - (c) change direction to align with the \mathbf{B} field and then speed up in the direction of \mathbf{B} .
 - (d) move at a constant speed in direction out of the page.
 - (e) None of the above.
- Q2.** Suppose the sphere has twice the original mass (i.e. mass $2M$). When this sphere enters the \mathbf{B} region it will...
- (a) move at half the original constant speed in direction out of the page.
 - (b) speed up in direction out of the page, but at about half the rate as before.
 - (c) change direction to align with the \mathbf{B} field and then move at twice the constant speed as before in the direction of \mathbf{B} .
 - (d) change direction to align with the \mathbf{B} field and then speed up in the direction of \mathbf{B}
 - (e) None of the above.
- Q3.** Suppose the sphere moves at twice the constant speed (i.e. speed $2v$) in its original direction. When it enters the \mathbf{B} field region it will...
- (a) move at twice the constant speed in direction out of the page.
 - (b) speed up in the direction out of the page, but at about twice the rate as before.
 - (c) change direction to align with the \mathbf{B} field and then move at twice the constant speed as before in direction of \mathbf{B} .
 - (d) change direction to align with the \mathbf{B} field and then speed up as in direction of \mathbf{B}
 - (e) None of the above.



A sphere with positive charge and mass M , moves at constant speed towards the right. It enters a region with a *uniform magnetic field* \mathbf{B} (see figure above). For the following questions, indicate your choice by circling the corresponding letter, **a** to **e**.

- Q4.** After entering the magnetic field \mathbf{B} region the sphere will ...
- (a) speed up in the direction of \mathbf{B} , that is to the right.
 - (b) continue at the same constant speed in its original direction.
 - (c) speed up in direction out of the page.
 - (d) continue at the same constant speed in direction out of the page.
 - (e) None of the above.
- Q5.** After the sphere enters the \mathbf{B} field region, the \mathbf{B} field is changed in direction, now pointing upward. Then the sphere will...
- (a) change direction to align with the \mathbf{B} field and then move at constant speed in the direction of \mathbf{B} .
 - (b) change direction to align with the \mathbf{B} field and then speed up in the direction of \mathbf{B} .
 - (c) continue moving as it did before the direction of \mathbf{B} was changed.
 - (d) speed up in direction out of the page.
 - (e) None of the above.

