

1. A 2.0 C charge with a mass of 6.0 kg is moving with a velocity of 12 m/s perpendicular to a magnetic field of 5.0 T. What is the radius of its trajectory?

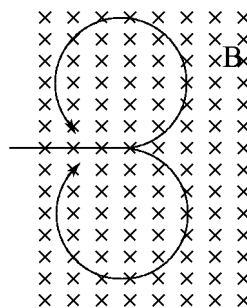
A) 0.2 m  
B) 0.8 m  
C) 1.25 m  
D) 5.0 m  
E) 7.2 m

Base your answers to questions 2 and 3 on the following situation. Several particles are projected into a uniform magnetic field with the same velocity perpendicular to the field lines.

2. The particle that would move in a circular path with the greatest radius is
- A) Proton  
B) Electron  
C) Positron  
D) Alpha  
E) Neutron
3. The particle that would continue motion in a straight line is
- A) Proton  
B) Electron  
C) Positron  
D) Alpha  
E) Neutron

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4.



Two charged particles are projected into a region with a uniform magnetic field and take circular paths with the same radius, but opposite direction, as shown above. These particles are most likely

- A) an electron and a proton  
B) an alpha particle and a beta particle  
C) a proton and a neutron  
D) an electron and a positron  
E) a neutron and a neutrino
5. A 4 mA beam of electrons enters a 2 T magnetic field and moves in a circle with a radius of 3 m. The plane of this circle is perpendicular to the magnetic field. Which of the following is the most nearly the work done by the magnetic field on the particle during 5 s?
- A) 0 J  
B)  $10^{-20}$  J  
C)  $10^{-3}$  J  
D)  $10^4$  J  
E)  $10^{22}$  J
6. A beam of electrons enters a magnetic field. Which of the following best describes their motion?
- A) They continue in a straight line.  
B) They are bent toward Magnetic North.  
C) They exhibit circular motion in the counterclockwise direction.  
D) They exhibit circular motion in the clockwise direction.  
E) Not enough information is given.

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7. A particle of mass  $m$  and charge  $q$  moves with an initial velocity  $v$  perpendicular to a magnetic field  $B$ . What is the radius of the trajectory of this particle after it enters the magnetic field?

A)  $qB/mv$

B)  $mvB/q$

C)  $mv/qB$

D)  $mv^2q/B$

E)  $mv^2/qB$

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**Answer Key**  
**B Force on a Moving Charge MC Questions [Mar 28, 2011]**

1.   E
  2.   D
  3.   E
  4.   D
  5.   A
  6.   E
  7.   C
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Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_