29-02

Question 821 0.31-60%

A charged particle is placed in a region of space and it experiences a force only when it is in motion. It can be conclude that the region encloses

(a) A magnetic field only.
(b) An electric field only.
(c) Both a magnetic field and a gravitational field.
(d) Both a magnetic field and an electric field.
(e) Both a gravitational field and an electric field.

29-02

Question 822 0.48-63%

An electron enters a region that contains a magnetic field directed into the page as shown in figure 7. The velocity of the electron makes an angle of 30 degrees with the +y axis. What is the direction of the magnetic force on the electron when it enters the field?

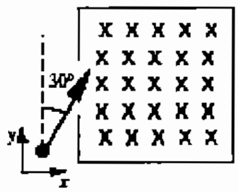

Figure 7

(a) at an angle of 30 degrees below the positive x axis and in the plane of the page.
(b) at an angle of 30 degrees above the positive x axis and in the plane of the page.
(c) upwards and out of the page.
(d) at an angle of 60 degrees below the positive x axis and in the plane of the page.
(e) at an angle of 60 degrees above the positive x axis and in the plane of the page.

29-02

Question 823 0.35-56%

For a charged particle moving in a magnetic field, the magnetic field can

(1) change its velocity.
(2) change its speed.
(3) change its acceleration.
(4) change its kinetic energy.

(a) 1 and 2 only.
(b) 4 only.
(c) 1 and 3 only.
(d) 3 and 4 only.
(e) 1, 2, 3, and 4.

29-3 Crossed fields: Discovery of the Electron

29-03

Question 824

In the velocity selector, an electron passes, without deflection, through a region where there is an electric and a magnetic field perpendicular to each other. If the electric field is E=4.5*10**3 V/m and the magnetic field is B=9.0*10**-3 T, what is the kinetic energy of the electron, in electron Volts? (1 eV=1.6*10**-19 J)

(a) 2.84 eV.
(b) 0.54 eV.
(c) 1.40 eV.
(d) 0.35 eV.
(e) 0.71 eV.

29-03

Question 825
In a region where an electric field E and a magnetic field B are perpendicular to each other, a beam of charged particles, each of mass m and charge q, passes through this region. The kinetic energy of a particle passing undeflected normal to these two fields is:
(a) m q /(2 E B).
(b) m E**2 /(2 B**2).
(c) m q B /(2 E).
(d) m E**2 /(2 q B).
(e) m B**2 /(2 q E**2).

29-03
Question 826 0 46-35%
An electric field of 1.5*10**3 V/m and a magnetic field of 0.50 T act on a moving electron to produce no net force. Calculate the minimum speed of the moving electron.
(a) Zero.
(b) 3.0*10**3 m/s.
(c) 7.5*10**3 m/s.
(d) 0.75*10**3 m/s.
(e) 4.5*10**3 m/s.

29-03
Question 827 0 32-31%
An electron enters a region of uniform electric and magnetic fields. It is observed that the velocity of the electron is unaffected. A possible explanation is that the velocity is:
(a) parallel to B
(b) perpendicular to B and parallel to E
(c) perpendicular to E and parallel to B
(d) perpendicular to both E and B
(e) parallel to E and has magnitude E/B

29-03
Question 828 0 48-43%
A proton with velocity v = (2.0*10**6) i (m/s) moves horizontally into a region of space in which there is an electric field E = (- 5000) j (N/C) and a magnetic field B. Find the smallest magnetic field such that the proton will continue to move horizontally undeflected. (i, j and k are unit vectors in the x, y and z directions, respectively)
(a) (1.5 i + 2.5 j)*10**(-3) (T)
(b) + 2.5*10**(-3) j (T)
(c) - 2.5*10**(-3) k (T)
(d) + 2.5*10**(-3) k (T)
(e) - 2.5*10**(-3) j (T)

29-03
Question 829 0 35-62%
An electric field and a magnetic field normal to each other. The electric field is 4.0 kV/m and the magnetic field strength is 2.0 mT. They are act on a moving electron to produce no force, calculate the electron speed.
(a) 8.0*10**6 m/s.
(b) 3.0*10**9 m/s.
(c) 2.0*10**6 m/s.
(d) 1.2*10**6 m/s.
(e) 5.2*10**7 m/s.