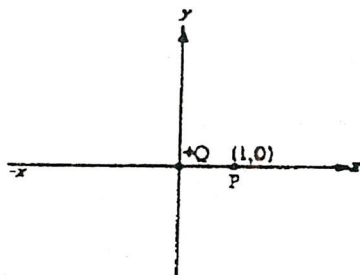


No. 63

A point charge is placed at the center of an uncharged, spherical, conducting shell of radius  $R$ . The electric fields inside and outside the sphere are measured. The point charge is then moved off center a distance  $R/2$  and the fields are measured again. What is the effect on the electric fields?

- (A) Changed neither inside nor outside
- (B) Changed inside but not changed outside
- (C) Not changed inside but changed outside
- (D) Changed inside and outside
- (E) It cannot be determined without further information.

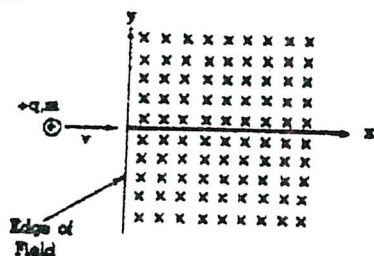
No. 64



A positive charge  $+Q$  located at the origin produces an electric field  $E_0$  at point  $P(x=+1, y=0)$ . A negative charge  $-2Q$  is placed at such a point as to produce a net field of zero at point  $P$ . The second charge will be placed on the

- (A) x-axis where  $x > 1$
- (B) x-axis where  $0 < x < 1$
- (C) x-axis where  $x > 0$
- (D) x-axis where  $y > 1$
- (E) x-axis where  $y < 0$

No. 65

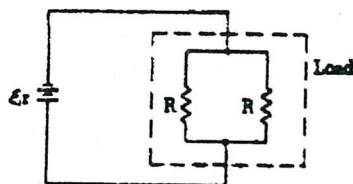


A particle of charge  $+q$  and mass  $m$  is projected with velocity  $v$  along the  $+x$ -axis into a uniform magnetic field  $B$ , which is directed into the page as shown above. The  $B$  field extends from  $x=0$  to  $x=\infty$ .

If the particle enters the field at the point where  $x=0$  and  $y=0$ , it will emerge from the field with velocity  $-v$  at the point where  $x=0$  and

- (A)  $y = +\frac{mv}{qB}$
- (B)  $y = +\frac{2mv}{qB}$
- (C)  $y = 0$
- (D)  $y = -\frac{mv}{qB}$
- (E)  $y = -\frac{2mv}{qB}$

No. 66



A battery having emf  $\epsilon$  and internal resistance  $r$  is connected to a load consisting of two parallel resistors each having resistance  $R$ . At what value of  $R$  will the power dissipated in the load be a maximum?

- (A) 0
- (B)  $\frac{r}{2}$
- (C)  $r$
- (D)  $2r$
- (E)  $4r$

No. 67

The two plates of a parallel-plate capacitor are a distance  $d$  apart and are mounted on insulating supports. A battery is connected across the capacitor to charge it and is then disconnected. The distance between the insulated plates is then increased to  $2d$ . If fringing of the field is still negligible, which of the following quantities is doubled?

- (A) The capacitance of the capacitor
- (B) The total charge on the capacitor
- (C) The surface density of the charge on the plates of the capacitor
- (D) The energy stored in the capacitor
- (E) The intensity of the electric field between the plates of the capacitor