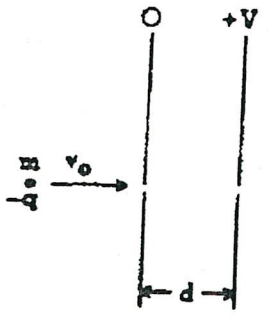
No. 56



As shown in the diagram above, a charged particle having mass m and charge –q is projected into the region between two parallel plates with a speed v_o to the right. The potential difference between the plates is V and they are separated by a distance d. What is the net change in kinetic energy of the particle during the time it takes the particle to traverse the distance d ?

(A) $+\frac{mv_o^2}{2}$ (B) $-\frac{qV}{d}$

(C) $+\frac{2qV}{mv_o^2}$ (D) $+qV$

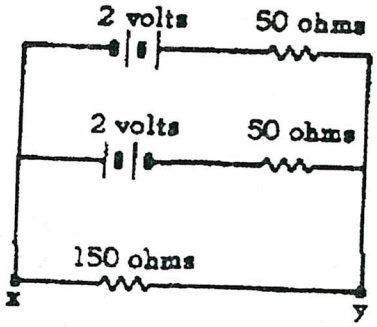
(E) None of the above

No. 57

Two conducting spheres, one having twice the diameter of the other, are shown above. The smaller sphere initially has a charge +q. When the spheres are connected by a thin wire, which of the following is true?

(A) 1 and 2 are both at the same potential.
(B) 2 has twice the potential of 1.
(C) 2 has half the potential of 1.
(D) 1 and 2 have equal charges.
(E) All of the charge is dissipated.

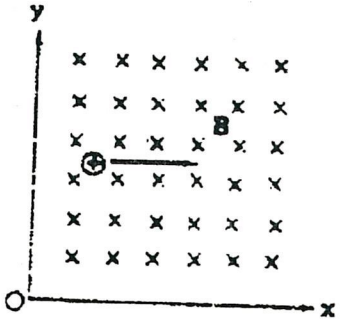
No. 58



In the circuit shown above, the current in each battery is 0.04 ampere. What is the potential difference between the points x and y ?

(A) 8 V (B) 6 V (C) 4 V (D) 2 V (E) 0 V

No. 59



A positively charged particle moves in the + x direction in a region of uniform magnetic field B directed into the page as shown above. The resultant force on the particle can be made equal to zero by the application of a uniform electric field in the

(A) + y direction.
(B) – y direction
(C) + x-direction
(D) – x-direction
(E) direction perpendicular to and our of the page