

36. Two small spheres have equal charges q and are separated by a distance d . The force exerted on each sphere by the other has magnitude F . If the charge on each sphere is doubled and d is halved, the force on each sphere has magnitude

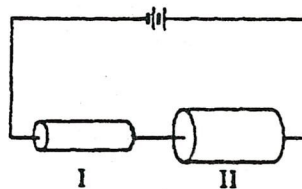
- (A) F
- (B) $2F$
- (C) $4F$
- (D) $8F$
- (E) $16F$

37. Which of the following statements about conductors under electrostatic conditions is true?

- (A) Positive work is required to move a positive charge over the surface of a conductor.
- (B) Charge that is placed on the surface of a conductor always spreads evenly over the surface.
- (C) The electric potential inside a conductor is always zero.
- (D) The electric field at the surface of a conductor is tangent to the surface.
- (E) The surface of a conductor is always an equipotential surface.

38. A charged particle traveling with a velocity \mathbf{v} in an electric field \mathbf{E} experiences a force \mathbf{F} that must be

- (A) parallel to \mathbf{v}
- (B) perpendicular to \mathbf{v}
- (C) parallel to $\mathbf{v} \times \mathbf{E}$
- (D) parallel to \mathbf{E}
- (E) perpendicular to \mathbf{E}



39. Two resistors of the same length, both made of the same material, are connected in a series to a battery as shown above. Resistor II has a greater cross-sectional area than resistor I. Which of the following quantities has the same value for each resistor?

- (A) Potential difference between the two ends
- (B) Electric field strength within the resistor
- (C) Resistance
- (D) Current per unit area
- (E) Current

40. A positive charge of 3.0×10^{-8} coulomb is placed in an upward-directed uniform electric field of 4.0×10^4 newtons per coulomb. When the charge is moved 0.5 meter upward, the work done by the electric force on the charge is

- (A) 6×10^{-4} J
- (B) 12×10^{-4} J
- (C) 2×10^4 J
- (D) 8×10^4 J
- (E) 12×10^4 J

41. Which of the following can be used along with fundamental constants, but no other quantities, to calculate the magnitude of the electric field E between the plates of a parallel-plate capacitor whose plate dimensions and spacing are not known?

- (A) The flux between the plates
- (B) The total charge on either plate
- (C) The potential difference between the plates
- (D) The surface charge density on either plate
- (E) The total energy stored in the capacitor