



1B quiz 1 version B

1. We have a hollow metallic sphere with charge -5.0 mC and radius 5.0 cm. We insert a $+10$ mC charge at the center of the sphere through a hole in the surface. What charge now rests on the outer surface of the sphere?

 - a. $+5$ mC
 - b. $+10$ mC
 - c. $+15$ mC
 - d. -5 mC
2. Four charges are at the corners of a square, with B and C on opposite corners. Charges A and D, on the other two corners, have equal charge, while both B and C have a charge of $+2.0$ C. What is the charge on A so that the force on B is zero?

 - a. -1.0 C
 - b. $-.71$ C
 - c. $-.5$ C
 - d. $-.35$ C
3. Two point charges each have a value of $+30.0$ mC and are separated by a distance of 4.00 cm. What is the magnitude of the electric field midway between the two charges? ($k_e = 8.99 \times 10^9 \text{ Nm}^2/\text{C}^2$)

 - a. zero

- b. $5.1 \times 10^7 \text{ N/C}$
 - c. $10.2 \times 10^7 \text{ N/C}$
 - d. $20.4 \times 10^7 \text{ N/C}$
4. An electron starts from rest from a position 75 cm away from a fixed point charge of magnitude $q = -0.15\mu\text{C}$. How fast will it be moving when it is very far away? The mass of the electron is $9.1 \times 10^{-31} \text{ kg}$ and its charge is $-1.6 \times 10^{-19} \text{ C}$
- a. $2.5 \times 10^7 \text{ m/s}$
 - b. $1.4 \times 10^7 \text{ m/s}$
 - c. $7.6 \times 10^6 \text{ m/s}$
 - d. $3.1 \times 10^6 \text{ m/s}$
5. Find the equivalent capacitance (i.e. the ratio of total charge to battery voltage) for the circuit shown in the Figure.
- a. 1.25 F
 - b. 1.71 F
 - c. 4.7 F
 - d. 6.7 F
6. How strong is the electric field between the plates of a $.8 \text{ mF}$ capacitor, if the plates are 4.0 mm apart, the gap is filled with air, and plate each has a charge of $720 \mu\text{C}$?
- a. 90 N/C
 - b. 225 N/C
 - c. 450 N/C
 - d. $3.2 \times 10^4 \text{ N/C}$
7. A $3\mu\text{C}$ charge is located at the position $(x, y) = (0., 3.0\text{m})$. What is the electric field at observation position $(x, y) = (4.0\text{m}, 9.0\text{m})$?
- a. $519\text{V/m} \left(.554\hat{i} - .832\hat{j} \right)$

- b. $4110V/m \left(.554\hat{i} - .832\hat{j} \right)$
- c. $4110V/m \left(.554\hat{i} + .832\hat{j} \right)$
- d. $519V/m \left(.554\hat{i} + .832\hat{j} \right)$

8. A spherical volume of space of radius 0.600 m has an electric field of intensity 100 N/C directed radially inward everywhere on its surface. What is the net charge enclosed within this surface?

- a. 6.8 nC
- b. 4.0 C
- c. -6.8 nC
- d. -4 nC