

## w10q1

**Multiple Choice**

Identify the letter of the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. A spherical volume of space has an electric field of intensity 100 N/C directed radially outward from its surface of radius 0.600 m. What is the net charge enclosed within this surface?
- 6.8 nC
  - 4.0 nC
  - 6.8 nC
  - 4.0 nC
  - 6.0 nC
- \_\_\_\_\_ 2. Imagine a charge of -5nC placed at the position  $x=0$ ,  $y=+1$  cm and another charge of +15nC placed at  $x=-3$  cm,  $y=1$  cm. Find the magnitude of the force that would be exerted on a third charge with  $Q=10$ nC placed at the origin
- 5.9 mN
  - 7.8mN
  - 3.2 mN
  - 4.3 mN
- \_\_\_\_\_ 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? ( $k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$ )
- zero
  - $5.1 \times 10^7 \text{ N/C}$
  - $10.1 \times 10^7 \text{ N/C}$
  - $40.5 \times 10^7 \text{ N/C}$
  - $20.3 \times 10^7 \text{ N/C}$
- \_\_\_\_\_ 4. Electrons in a particle beam each have a kinetic energy of  $3.2 \times 10^{-17} \text{ J}$ . What is the magnitude of the electric field that will stop these electrons in a distance of 0.2 m? ( $e = 1.6 \times 10^{-19} \text{ C}$ )
- 2 000 N/C
  - 500 N/C
  - 100 N/C
  - 1 000 N/C
  - 5 000 N/C
- \_\_\_\_\_ 5. A Van de Graaff generator (a device used for storing charge) contains a spherical metallic dome of radius 20 cm. Operating in dry air, where "atmospheric breakdown" is at  $E_{\text{max}} = 3.0 \times 10^6 \text{ N/C}$ , what is the maximum charge that can be held on the dome? ( $k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$ )
- $1.2 \times 10^{-6} \text{ C}$
  - $2.5 \times 10^{-6} \text{ C}$
  - $2.7 \times 10^{-5} \text{ C}$
  - $1.3 \times 10^{-5} \text{ C}$
  - $2.6 \times 10^{-6} \text{ C}$

- \_\_\_\_\_ 6. We have a hollow metallic sphere with charge  $-5.0 \mu\text{C}$  and radius  $5.0 \text{ cm}$ . We insert a  $+10 \mu\text{C}$  charge at the center of the sphere through a hole in the surface. What charge now rests on the outer surface of the sphere?
- $-10 \mu\text{C}$
  - $-5 \mu\text{C}$
  - $+5 \mu\text{C}$
  - $+10 \mu\text{C}$
  - $+15 \mu\text{C}$
- \_\_\_\_\_ 7. Two identical balls have the same amount of charge, but the charge on ball A is positive and the charge on ball B is negative. The balls are placed on a smooth, level, frictionless table whose top is an insulator. Which of the following is true?
- Since the force on A is equal but opposite to the force on B, they will not move.
  - They will move together with constant acceleration.
  - Since the forces are opposite in direction, the balls will move away from each other.
  - Since the force on both balls is negative they will move in the negative direction.
  - None of the above is correct.
- \_\_\_\_\_ 8. A  $-12.0 \mu\text{C}$  charge is placed at the origin and a second charge is placed on the x-axis at  $x = 0.30 \text{ m}$ . If the resulting force on the second charge is  $5.4 \text{ N}$  in the positive x-direction, what is the value of its charge?
- $4.5 \mu\text{C}$
  - $-4.5 \text{ nC}$
  - $45 \text{ nC}$
  - $-4.5 \mu\text{C}$
  - $4.5 \text{ nC}$

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**Answer Section****MULTIPLE CHOICE**

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|-----------|--------|---|
| 1. ANS: B | DIF: 2 | TOP: 15.9 Electric Flux and Gauss's Law           |
| 2. ANS: D |        |   |
| 3. ANS: A | DIF: 2 | TOP: 15.4 The Electric Field                      |
| 4. ANS: D | DIF: 2 | TOP: 15.4 The Electric Field                      |
| 5. ANS: D | DIF: 3 | TOP: 15.8 The Van de Graaff Generator             |
| 6. ANS: C | DIF: 3 | TOP: 15.6 Conductors in Electrostatic Equilibrium |
| 7. ANS: E | DIF: 2 | TOP: 15.6 Conductors in Electrostatic Equilibrium |
| 8. ANS: D | DIF: 2 | TOP: 15.3 Coulomb's Law                           |