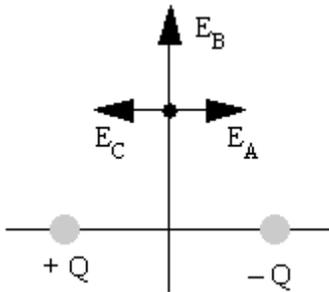


AP physics B web review ch 15 electric forces and fields**Please do not write on my tests****Multiple Choice***Identify the choice that best completes the statement or answers the question.*

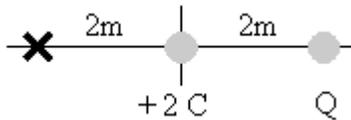
- _____ 1. If body M, with a positive charge, is used to charge body N by induction, what will be the nature of the charge left on the latter?
- must be equal in magnitude to that on M
 - must be negative
 - must be positive
 - must be greater in magnitude than that on M
 - must be positive on the surface of N
- _____ 2. If the distance between two point charges is tripled, the mutual force between them will be changed by what factor?
- 9.0
 - 3.0
 - 0.33
 - 1/9
 - 6.0
- _____ 3. Two point charges, separated by 1.5 cm, have charge values of +2.0 and $-4.0 \mu\text{C}$, respectively. What is the value of the mutual force between them? ($k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- 320 N
 - $3.6 \times 10^{-8} \text{ N}$
 - $8.0 \times 10^{-12} \text{ N}$
 - $3.1 \times 10^{-3} \text{ N}$
 - 16 N
- _____ 4. In a thundercloud there may be an electric charge of +40 C near the top of the cloud and -40 C near the bottom of the cloud. These charges are separated by about 2.0 km. What is the electric force between these two sets of charges? ($k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- $3.6 \times 10^4 \text{ N}$
 - $3.6 \times 10^5 \text{ N}$
 - $3.6 \times 10^6 \text{ N}$
 - $3.6 \times 10^7 \text{ N}$
 - $3.6 \times 10^8 \text{ N}$
- _____ 5. An electron is sent at high speed toward a gold nucleus (charge $+79e$). What is the electrical force acting on the electron when it is $3.0 \times 10^{-14} \text{ m}$ away from the gold nucleus? ($e = 1.6 \times 10^{-19} \text{ C}$, $k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- 20 N
 - 0.25 N
 - $2.0 \times 10^{-4} \text{ N}$
 - $2.1 \times 10^{-6} \text{ N}$
 - $4.8 \times 10^{-10} \text{ N}$

- _____ 6. Two electrons are separated by one cm. What is the ratio of the electric force to the gravitational force between them? ($m_e = 9.11 \times 10^{-31}$ kg, $k_e = 8.99 \times 10^9$ N·m²/C², $G = 6.67 \times 10^{-11}$ N·m²/kg², and $e = 1.6 \times 10^{-19}$ C)
- 2.3×10^2
 - 1.3×10^{20}
 - 3.1×10^{22}
 - 4.2×10^{42}
 - 8.0×10^{44}
- _____ 7. A $6.00 \mu\text{C}$ charge is placed at the origin and a second charge is placed on the x -axis at $x = 0.300$ m. If the resulting force on the second charge is 6.40 N in the positive x -direction, what is the force on the charge at the origin?
- 6.40 N in the positive x -direction
 - 6.40 N in the negative x -direction
 - 0 N
 - not able to be determined until the second charge is known
 - a $6.00 \mu\text{C}$ charge cannot act with a force of 6.40 N
- _____ 8. Two point charges are separated by 10.0 cm and have charges of $+2.00 \mu\text{C}$ and $-2.00 \mu\text{C}$, respectively. What is the electric field at a point midway between the two charges? ($k_e = 8.99 \times 10^9$ N·m²/C²)
- 28.8×10^6 N/C
 - 14.4×10^6 N/C
 - 7.19×10^6 N/C
 - 3.59×10^6 N/C
 - zero
- _____ 9. Charges of $4.0 \mu\text{C}$ and $-6.0 \mu\text{C}$ are placed at two corners of an equilateral triangle with sides of 0.10 m. At the third corner, what is the electric field magnitude created by these two charges? ($k_e = 8.99 \times 10^9$ N·m²/C²)
- 4.5×10^6 N/C
 - 3.1×10^6 N/C
 - 1.6×10^6 N/C
 - 4.8×10^6 N/C
 - 7.5×10^6 N/C
- _____ 10. A proton initially moves left to right long the x axis at a speed of 2.00×10^3 m/s. It moves into an electric field, which points in the negative x direction, and travels a distance of 0.200 m before coming to rest. What acceleration magnitude does the proton experience?
- 6.67×10^3 m/s²
 - 1.00×10^7 m/s²
 - 9.33×10^9 m/s²
 - 2.67×10^{11} m/s²
 - 5.52×10^{14} m/s²

- _____ 11. Two charges, $+Q$ and $-Q$, are located two meters apart and there is a point along the line that is equidistant from the two charges as indicated. Which vector best represents the direction of the electric field at that point?



- a. Vector E_A
 b. Vector E_B
 c. Vector E_C
 d. The electric field at that point is zero.
 e. The electric field is opposite to E_B .
- _____ 12. A charge of $+2\text{ C}$ is at the origin. When charge Q is placed at 2 m along the positive x axis, the electric field at 2 m along the negative x axis becomes zero. What is the value of Q ?



- a. -3 C
 b. -6 C
 c. -7 C
 d. -8 C
 e. -10 C
- _____ 13. 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 0.1 m ? ($e = 1.6 \times 10^{-19}\text{ C}$)
- a. 200 N/C
 b. $1\,000\text{ N/C}$
 c. $2\,000\text{ N/C}$
 d. $4\,000\text{ N/C}$
 e. $10\,000\text{ N/C}$
- _____ 14. The electric field associated with a uniformly charged hollow metallic sphere is the greatest at:
- a. the center of the sphere.
 b. the sphere's inner surface.
 c. infinity.
 d. the sphere's outer surface.
 e. points inside the sphere.

- _____ 15. At what point is the charge per unit area greatest on the surface of an irregularly shaped conducting solid?
- where surface curves inward
 - where surface is flat
 - where curvature is least
 - where curvature is greatest
 - where surface curves outward
- _____ 16. We have an initially uncharged hollow metallic sphere with radius of 5.0 cm. I place a small object with a charge of $+10 \mu\text{C}$ at the center of the sphere through a hole in the surface. Find the electric field present at a point 10 cm from the sphere's center. ($k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- $1.1 \times 10^6 \text{ N/C}$
 - $2.3 \times 10^6 \text{ N/C}$
 - $9.0 \times 10^6 \text{ N/C}$
 - $36 \times 10^6 \text{ N/C}$
 - $97 \times 10^6 \text{ N/C}$
- _____ 17. A ping-pong ball covered with a conducting graphite coating has a mass of $5.0 \times 10^{-3} \text{ kg}$ and a charge of $4.0 \mu\text{C}$. What electric field directed upward will exactly balance the weight of the ball? ($g = 9.8 \text{ m/s}^2$)
- $8.2 \times 10^2 \text{ N/C}$
 - $1.2 \times 10^4 \text{ N/C}$
 - $2.0 \times 10^{-7} \text{ N/C}$
 - $5.1 \times 10^6 \text{ N/C}$
 - $3.4 \times 10^{-3} \text{ N/C}$
- _____ 18. 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 force on both balls is negative they will move in the negative direction.
 - Since the forces are opposite in direction, the balls will move away from each other.
 - None of the above is correct.
- _____ 19. A thin uncharged conducting spherical shell has a charge q carefully placed at its center through a small hole in the shell. The charge q does not touch the shell. What is the charge on the shell?
- q
 - $-q$
 - $2q$
 - 0
 - $-2q$

- _____ 20. In Millikan's oil drop experiment, if the electric field between the plates was of just the right magnitude, it would exactly balance the weight of the drop. Suppose a tiny spherical oil droplet of radius 1.6×10^{-4} cm carries a charge equivalent to one electron. What electric field is required to balance the weight? (The density of oil is 0.85 g/cm^3 , $e = 1.6 \times 10^{-19} \text{ C}$.)
- a. $1.1 \times 10^5 \text{ N/C}$
 - b. $2.2 \times 10^5 \text{ N/C}$
 - c. $4.5 \times 10^5 \text{ N/C}$
 - d. $8.9 \times 10^5 \text{ N/C}$
 - e. $17 \times 10^5 \text{ N/C}$

**AP physics B web review ch 15 electric forces and fields
Answer Section**

MULTIPLE CHOICE

1. B
2. D
3. A
4. C
5. A
6. D
7. B
8. B
9. D
10. B
11. A
12. D
13. C
14. D
15. D
16. C
17. B
18. E
19. D
20. D