Closed book. No work needs to be shown for multiple-choice questions.

1. The force at a charge q2 a distance 22m from a point charge q1 is 340×10^{-6} N. If q2 is equal to 1.7×10^{-6} C, what is the electric field at q2?

a. 10 N/C.
b. 150 N/C.
c. 200 N/C.
d. 340 N/C.
e. 1.7 N/C.

2. A charge of 10×10^{-6} C is at a position (x=12m,y=0) and a charge of -5×10^{-6} C is at a position (x=12m,y=5m). What is the magnitude of the force at a charge of -4×10^{-6} C at the origin?

a. 20.28×10^{-9} N.
b. 20.28×10^{-3} N.
c. 1.56×10^{-6} N.
d. 20.28×10^{-3} N.
e. 1.56×10^{-3} N.

3. Charges of 4.0 μC and −6.0 μC are placed at two corners of an equilateral triangle with sides of 0.10 m. At the third corner, what is the magnitude of the electric field created by these two charges?

a. 4.5×10^{6} N/C
b. 3.1×10^{6} N/C
c. 1.6×10^{6} N/C
d. 4.8×10^{6} N/C
e. 2.2×10^{5} N/C

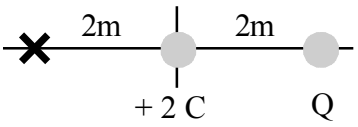
4. An electric field of intensity 3.5 kN/C is applied along the x-axis. Calculate the electric flux through a rectangular plane of 0.35 m and wide and 0.7 m long parallel to the yz plane.

a. 0.86 $N.m^2/C$
b. 3.5 $N.m^2/C$
c. 245 $N.m^2/C$
d. 858 $N.m^2/C$
e. 3.5 10^3 $N.m^2/C$

5. An isolated charged point particle produces an electric field with magnitude E at a point 2 m away. A point at which the field magnitude is $E/9$ is:

a. 1 m away from the particle.
b. 6 m away from the particle.
c. 9 m away from the particle.
d. 4 m away from the particle.
e. 18 m away from the particle.

6. A charge of +2 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?

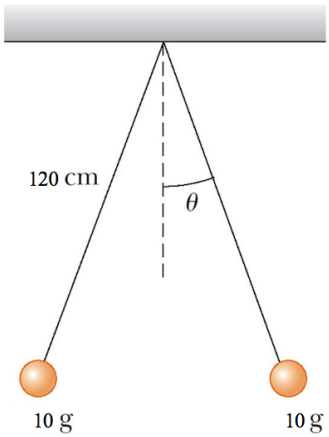


a. –3 C
b. –6 C
c. –7 C
d. –8 C
e. –4 C

7. A charge of -15 nC is located at the center of a spherical shell with radius 20 cm. Determine the electric flux through only one hemisphere (half of the sphere)

a. 0.85×10^3 N.m^2/C pointing in
b 1.7×10^3 N.m^2/C pointing out
c. 1.7×10^3 N.m^2/C pointing in
d. 15×10^{-9} N.m^2/C pointing in
e. 15×10^{-9} N.m^2/C pointing out

8. Two identical conducting balls of mass 10 grams are hung from thin threads of length 120 cm and carry the same charge q. Assume the angle the threads make from the vertical is $\theta = 45°$. What is the value of each charge?



a. 1.4 μC.
b. 2.8 μC.
c. 4.2 nC.
d. 5.6 μC.
e. Not enough information is given to solve this problem.

Recall that

$k_e = 1/(4\pi\varepsilon_0) = 8.99 \times 10^9\ N.m^2/C^2$

and

$\varepsilon_0 = 8.85 \times 10^{-12}\ C^2/(N.m^2)$