Multiple Choice

18.1 Electrical Charges, Conservation of Charge, and Transfer of Charge 36.

A neutral hydrogen atom has one proton and one electron. If you remove the electron, what will be the leftover sign of the charge?

a. negative
b. positive
c. zero
d. neutral

37.

What is the charge on a proton?

a. $+8.99 \times 10^{-9}$ C
b. -8.99×10^{-9} C
c. $+ 1.60 \times 10^{-19}$ C
d. -1.60×10^{-19} C

38.

True or false—Carbon is more conductive than pure water.

a. true
b. false

39.

True or false—Two insulating objects are polarized. To cancel the polarization, it suffices to touch them together.

a. true
b. false

40.

How is the charge of the proton related to the charge of the electron?

a. The magnitudes of charge of the proton and the electron are equal, but the charge of the proton is positive, whereas the charge of the electron is negative.
b. The magnitudes of charge of the proton and the electron are unequal, but the charge of the proton is positive, whereas the charge of the electron is negative.
c. The magnitudes of charge of the proton and the electron are equal, but the charge of the proton is negative, whereas the charge of the electron is positive.
d. The magnitudes of charge of the proton and the electron are unequal, but the charge of the proton is negative, whereas the charge of the electron is positive.

18.2 Coulomb's law 41.

If you double the distance between two point charges, by which factor does the force between the particles change?

a. 1/2
b. 2
c. 4
d. 1/4

42.

The combined charge of all the electrons in a dime is hundreds of thousands of coulombs. Because like charges repel, what keeps the dime from exploding?

a. The dime has an equal number of protons, with positive charge.
b. The dime has more protons than electrons, with positive charge.
c. The dime has fewer protons than electrons, with positive charge.
d. The dime is polarized, with electrons on one side and protons on the other side.

43.

How can you quadruple the electrical force between two charged particles?

a. Increase the distance between the charges by a factor of two.
b. Increase the distance between the charges by a factor of four.
c. Increase the product of the charges by a factor of two
d. Increase the product of the charges by a factor of four.

18.3 Electric Field 44.

What is the magnitude of the electric field 12 cm from a charge of 1.5 nC ?

a. 9.4×10^7 N/ C
b. 1.1×10^2 N/C
c. 9.4×10^2 N/C
d. 9.4×10^{-2} N/C

45.

A charge distribution has electric field lines pointing into it. What sign is the net charge?

a. positive
b. neutral
c. final
d. negative

46.

If five electric field lines come out of point charge q_1 and 10 electric-field lines go into point charge q_2, what is the ratio q_1/q_2?

a. –2
b. –1
c. –1/2
d. 0

47.

True or false—The electric-field lines from a positive point charge spread out radially and point outward.

a. false
b. true

18.4 Electric Potential 48.

What is the potential at 1.0 m from a point charge $Q = -25$ nC?

a. 6.6×10^2 V
b. -2.3×10^2 V
c. -6.6×10^2 V
d. 2.3×10^2 V

49.

Increasing the distance by a factor of two from a point charge will change the potential by a factor of how much?

a. 2
b. 4
c. 1/2
d. 1/4

50.

True or false—*Voltage* is the common word for potential difference, because this term is more descriptive than potential difference.

a. false
b. true

18.5 Capacitors and Dielectrics 51.

Which magnitude of charge is stored on each plate of a 12 µF capacitor with 12 V applied across it?

a. -1.0×10^{-6} C
b. 1.0×10^{-6} C
c. -1.4×10^{-4} C
d. 1.4×10^{-4} C

52.

What is the capacitance of a parallel-plate capacitor with an area of 200 cm^2, a distance of 0.20 mm between the plates, and polystyrene as a dielectric?

a. 2.3 nC
b. 0.89 nC
c. 23 nC
d. 8.9 nC

53.

Which factors determine the capacitance of a device?

a. Capacitance depends only on the materials that make up the device.
b. Capacitance depends on the electric field surrounding the device.
c. Capacitance depends on the geometric and material parameters of the device.
d. Capacitance depends only on the mass of the capacitor