Halliday/Resnick/Walker Fundamentals of Physics

Classroom Response System Questions

Chapter 25 Capacitance

Interactive Lecture Questions

25.2.1. How much charge is on the plates of a 11-μF capacitor that has been connected to a 120 V dc power supply for a long time?

a) 1.3×10^{-3} C

b) 9.2×10^{-2} C

c) 1.1×10^{-4} C

d) 1.3×10^{-6} C

e) 1.2×10^{-1} C

25.2.1. How much charge is on the plates of a 11-μF capacitor that has been connected to a 120 V dc power supply for a long time?

a) 1.3×10^{-3} C

b) 9.2×10^{-2} C

c) 1.1×10^{-4} C

d) 1.3×10^{-6} C

e) 1.2×10^{-1} C

25.2.2. A 150-μF capacitor is fully-charged when it has 6.1×10^{-3} C on its plates. What is the potential difference across the plates of the capacitor?

a) 250 V

b) 41 V

c) 0.0024 V

d) 2.5 V

e) 4.1 V

25.2.2. A 150-μF capacitor is fully-charged when it has 6.1×10^{-3} C on its plates. What is the potential difference across the plates of the capacitor?

a) 250 V

b) 41 V

c) 0.0024 V

d) 2.5 V

e) 4.1 V

25.4.1. Capacitor B has one-half the capacitance of capacitor A. How does the charge on capacitor A compare to that on B when the two are connected in series to a battery for a long time?

a) The charge on capacitor A is one-fourth the charge on capacitor B.

b) The charge on capacitor A is one-half the charge on capacitor B.

c) The charge on capacitor A is the same as the charge on capacitor B.

d) The charge on capacitor A is twice the charge on capacitor B.

e) The charge on capacitor A is four times the charge on capacitor B.

25.4.1. Capacitor B has one-half the capacitance of capacitor A. How does the charge on capacitor A compare to that on B when the two are connected in series to a battery for a long time?

a) The charge on capacitor A is one-fourth the charge on capacitor B.

b) The charge on capacitor A is one-half the charge on capacitor B.

c) The charge on capacitor A is the same as the charge on capacitor B.

d) The charge on capacitor A is twice the charge on capacitor B.

e) The charge on capacitor A is four times the charge on capacitor B.

25.4.2. Capacitor B has one-half the capacitance of capacitor A. How does the charge on capacitor A compare to that on B when the two are connected in parallel with a battery for a long time?

a) The charge on capacitor A is one-fourth the charge on capacitor B.

b) The charge on capacitor A is one-half the charge on capacitor B.

c) The charge on capacitor A is the same as the charge on capacitor B.

d) The charge on capacitor A is twice the charge on capacitor B.

e) The charge on capacitor A is four times the charge on capacitor B.

25.4.2. Capacitor B has one-half the capacitance of capacitor A. How does the charge on capacitor A compare to that on B when the two are connected in parallel with a battery for a long time?

a) The charge on capacitor A is one-fourth the charge on capacitor B.

b) The charge on capacitor A is one-half the charge on capacitor B.

c) The charge on capacitor A is the same as the charge on capacitor B.

d) The charge on capacitor A is twice the charge on capacitor B.

e) The charge on capacitor A is four times the charge on capacitor B.

25.4.4. Two parallel conducting plates are connected to a battery for a long time and become fully-charged. How does the potential difference across the plates change, if at all, when a conducting slab is inserted in between the plates without touching either plate?

a) The potential difference will increase.

b) The potential difference will decrease.

c) The potential difference will remain unchanged.

25.4.4. Two parallel conducting plates are connected to a battery for a long time and become fully-charged. How does the potential difference across the plates change, if at all, when a conducting slab is inserted in between the plates without touching either plate?

a) The potential difference will increase.

b) The potential difference will decrease.

c) The potential difference will remain unchanged.

25.4.5. Two parallel conducting plates are connected to a battery for a long time and become fully-charged. How does the charge on the plates change, if at all, when a conducting slab is inserted in between the plates without touching either plate?

a) The charge will increase.

b) The charge will decrease.

c) The charge will remain unchanged.

25.4.5. Two parallel conducting plates are connected to a battery for a long time and become fully-charged. How does the charge on the plates change, if at all, when a conducting slab is inserted in between the plates without touching either plate?

a) The charge will increase.

b) The charge will decrease.

c) The charge will remain unchanged.

25.4.7. Three parallel plate capacitors, each having a capacitance of 1.0 μF are connected in series. The potential difference across the combination is 100 V. What is the charge on any one of the capacitors?

a) 33 μC

b) 330 μC

c) 3300 μC

d) 100 μC

e) 1000 μC

25.4.7. Three parallel plate capacitors, each having a capacitance of 1.0 μF are connected in series. The potential difference across the combination is 100 V. What is the charge on any one of the capacitors?

a) 33 μC

b) 330 μC

c) 3300 μC

d) 100 μC

e) 1000 μC

25.5.1. The plates of an isolated parallel plate capacitor are separated by a distance *d* and carry charge of magnitude *q*. The distance between the plates is then reduced to *d*/2. How is the energy stored in the capacitor affected by this change?

a) The energy increases to twice its initial value.

b) The energy increases to four times its initial value.

c) The energy is not affected by this change.

d) The energy decreases to one fourth of its initial value.

e) The energy decreases to one half of its initial value.

25.5.1. The plates of an isolated parallel plate capacitor are separated by a distance *d* and carry charge of magnitude *q*. The distance between the plates is then reduced to *d*/2. How is the energy stored in the capacitor affected by this change?

a) The energy increases to twice its initial value.

b) The energy increases to four times its initial value.

c) The energy is not affected by this change.

d) The energy decreases to one fourth of its initial value.

e) The energy decreases to one half of its initial value.

25.6.4. Which one of the following changes will necessarily increase the capacitance of a capacitor?

a) decreasing the charge on the plates

b) increasing the charge on the plates

c) placing a dielectric between the plates

d) increasing the potential difference between the plates

e) decreasing the potential difference between the plates

25.6.4. Which one of the following changes will necessarily increase the capacitance of a capacitor?

a) decreasing the charge on the plates

b) increasing the charge on the plates

c) placing a dielectric between the plates

d) increasing the potential difference between the plates

e) decreasing the potential difference between the plates

25.6.5. Complete the following statement: When a dielectric with constant κ is inserted between the plates of a charged *isolated* capacitor

a) the capacitance is reduced by a factor κ.

b) the charge on the plates is reduced by a factor of κ.

c) the charge on the plates is increased by a factor of κ.

d) the electric field between the plates is reduced by a factor of κ.

e) the potential difference between the plates is increased by a factor of κ

25.6.5. Complete the following statement: When a dielectric with constant κ is inserted between the plates of a charged *isolated* capacitor

a) the capacitance is reduced by a factor κ.

b) the charge on the plates is reduced by a factor of κ.

c) the charge on the plates is increased by a factor of κ.

d) the electric field between the plates is reduced by a factor of κ.

e) the potential difference between the plates is increased by a factor of κ

25.6.6. The figure shows four parallel plate capacitors: **A**, **B**, **C**, and **D**. Each capacitor carries the same charge *Q* and has the same plate area *A*. As suggested by the figure, the plates of capacitors **A** and **C** are separated by a distance *d* while those of **B** and **D** are separated by a distance 2*d*. Capacitors **A** and **B** are maintained in vacuum while capacitors **C** and **D** contain dielectrics with constant $\kappa = 5$. Which of the following choices ranks the capacitors in order of increasing capacitance?

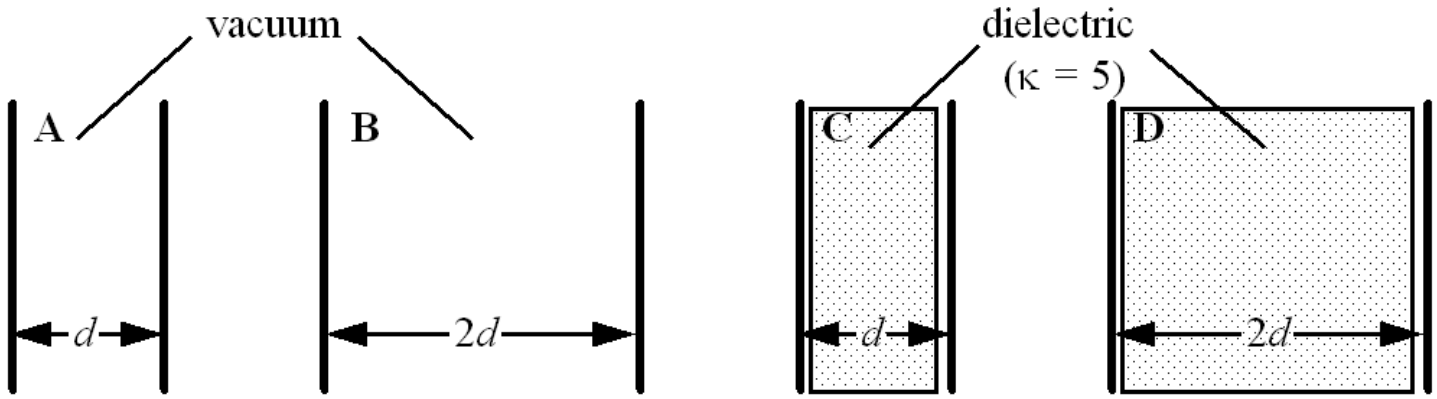
a) **A**, **B**, **C**, **D**

b) **B**, **A**, **C**, **D**

c) **A**, **B**, **D**, **C**

d) **B**, **A**, **D**, **C**

e) **D**, **C**, **B**, **A**



25.6.6. The figure shows four parallel plate capacitors: **A**, **B**, **C**, and **D**. Each capacitor carries the same charge *Q* and has the same plate area *A*. As suggested by the figure, the plates of capacitors **A** and **C** are separated by a distance *d* while those of **B** and **D** are separated by a distance 2*d*. Capacitors **A** and **B** are maintained in vacuum while capacitors **C** and **D** contain dielectrics with constant $\kappa = 5$. Which of the following choices ranks the capacitors in order of increasing capacitance?

a) **A**, **B**, **C**, **D**

b) **B**, **A**, **C**, **D**

c) **A**, **B**, **D**, **C**

d) **B**, **A**, **D**, **C**

e) **D**, **C**, **B**, **A**