# Halliday/Resnick/Walker Fundamentals of Physics 8th edition

## Classroom Response System Questions

## Chapter 24 Electric Potential

### Interactive Lecture Questions

24.2.1. Two electrons are separated by a distance $R$. If the distance between the charges is increased to $2R$, what happens to the total electric potential energy of the system?

a) The total electric potential energy of the system would increase to four times its initial value.

b) The total electric potential energy of the system would increase to two times its initial value.

c) The total electric potential energy of the system would remain the same.

d) The total electric potential energy of the system would decrease to one half its initial value.

e) The total electric potential energy of the system would decrease to one fourth its initial value.

24.2.2. The electric potential energy for two positive charges of magnitude $q$ and separated by a distance $r$ is $U_1$. What will the electric potential energy be if one of the charges is completely removed and replaced by a negative charge of the same magnitude?

a) $U_2 = 2U_1$

b) $U_2 = U_1$

c) $U_2 = -U_1$

d) $U_2 = -2\ U_1$

e) There is no way to determine this without knowing the value of $q$.

24.2.3. Why is an electrostatic force considered a conservative force?

a) Charged particles do not experience friction, which is a non-conservative force.

b) The energy required to move a charged particle around a closed path is equal to zero joules.

c) The work required to move a charged particle from one point to another does not depend upon the path taken.

d) Answers (a) and (b) are both correct.

e) Answers (b) and (c) are both correct.

24.3.1. Which one of the following statements best explains why it is possible to define an *electrostatic potential* in a region of space that contains an electrostatic field?

a) The work required to bring two charges together is independent of the path taken.

b) A positive charge will gain kinetic energy as it approaches a negative charge.

c) Like charges repel one another and unlike charges attract one another.

d) Work must be done to bring two positive charges closer together.

e) A negative charge will gain kinetic energy as it moves away from another negative charge.

24.3.2. A positive charge is located at the origin. What is the direction of the electric potential of the positive charge?

a) radially outward from the origin

b) radially inward from the origin

c) toward the positive *x*, *y*, and *z* directions

d) toward the negative *x*, *y*, and *z* directions

e) There is no direction since the electric potential is a scalar quantity.

24.4.4. Consider the equipotential lines shown in the box. The labeled cases indicate electric field line drawings. Which of these cases best matches the equipotential lines shown?

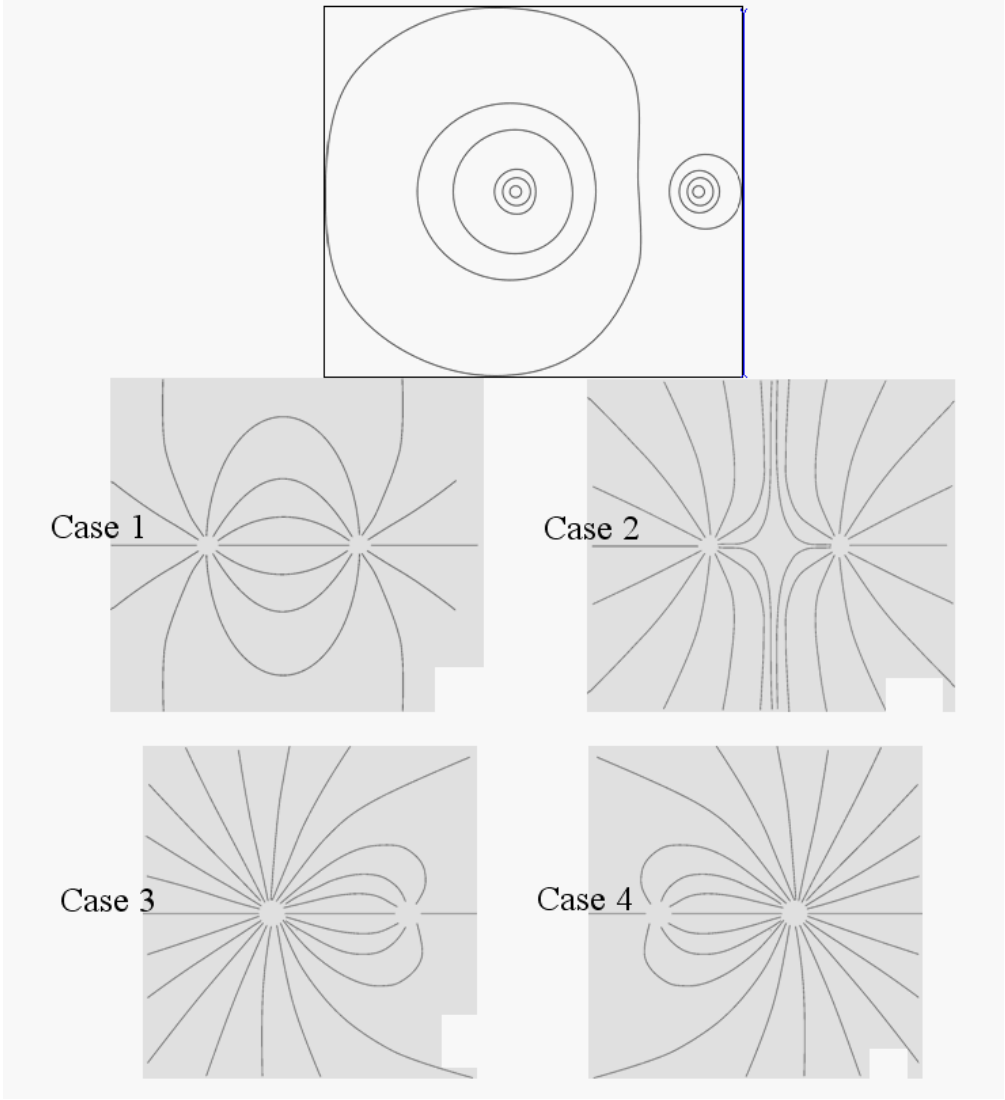
a) 1

b) 2

c) 3

d) 4

e) None of these cases match the equipotential lines shown.



24.7.2. Two point charges lie along the $x$ axis. One charge, located at the origin, has a magnitude $+2q$. The other charge of unknown magnitude and sign is located at $x = 5$ units. If the electric potential at $x = 4$ units is equal to zero volts, what is the magnitude and sign of the second point charge?

a) $-q/2$

b) $-q/4$

c) $-2q$

d) $+q/2$

e) $+2q$

24.7.3. A proton is moved from point B to point A in an electric field as shown. As a result of its movement, its potential increases to *V*. If three protons are moved from point B to A, how much will the electric potential of the protons increase?

a) *V*/9

b) *V*/3

c) *V*

d) 3*V*

e) 9*V*