

Chapter 21: Electrostatics
Electric Potential



Just as PE transforms to KE for a mass lifted against the gravitation field (left), the electric PE of an electric charge transforms to other forms of energy when it changes location in an electric field (right). In both cases, how does the KE acquired compare to the decrease in PE?



Complete the statements.



A force compresses the spring. The work done in compression is the product of the average force and the distance moved. $W = Fd$. This work increases the PE of the spring.

Similarly, a force pushes the charge (call it a test charge) closer to the charged sphere. The work done in moving the test charge is the product of the average _____ and the _____ moved. $W = \underline{\hspace{2cm}}$. This work _____ the PE of the test charge.



If the test charge is released, it will be repelled and fly past the starting point. Its gain in KE at this point is _____ to its decrease in PE.

At any point, a greater amount of test charge means a greater amount of PE. But not a greater amount of PE *per amount of charge*. The quantities PE (measured in joules) and PE/charge (measured in volts) are different concepts.

By definition: **Electric Potential = PE/charge**. 1 volt = 1 joule/1 coulomb. So 1 C of charge with a PE of 1 J has an electric potential of 1 V. And 2 C of charge with a PE of 2 J has an electric potential of _____ V.



If a conductor connected to the terminal of a battery has an electric potential of 12 V, then each coulomb of charge on the conductor has a PE of _____ J.



You do very little work in rubbing a balloon on your hair to charge it. The PE of several thousand billion electrons (about one-millionth coulomb [10^{-6} C]) transferred may be a thousandth of a joule [10^{-3} J]. Impressively, however, the electric potential of the balloon is about _____ V!

Why is contact with a balloon charged to thousands of volts not as dangerous as contact with household 110 V? _____

Conceptual Physics Answers Electrostatics

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Conceptual Physics Answers Electrostatics:

Instructor's Manual [to Accompany] Conceptual Physics, Eighth Ed Paul G. Hewitt, 1998 Conceptual Physics Tenth Edition helps readers connect physics to their everyday experiences and the world around them with additional help on solving more mathematical problems Hewitt's text is famous for engaging readers with analogies and imagery from real world situations that build a strong conceptual understanding of physical principles ranging from classical mechanics to modern physics With this strong foundation readers are better equipped to understand the equations and formulas of physics and motivated to explore the thought provoking exercises and fun projects in each chapter Included in the package is the workbook Mechanics Properties of Matter Heat Sound Electricity and Magnetism Light Atomic and Nuclear Physics Relativity For all readers interested in conceptual physics **Comprehensive Physics XII** Narinder Kumar, 2004

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Electro Magnetic Field Theory , Fusion Policy United States. Congress. House. Committee on Science, Space, and Technology. Subcommittee on Energy,1995 Distributed to some depository libraries in microfiche

2008 Physics Education Research Conference Charles Henderson,Mel Sabella,Leon Hsu,2008-11-21 The 2008 Physics Education Research Conference brought together researchers studying a wide variety of topics in physics education The conference theme was Physics Education Research with Diverse Student Populations Researchers specializing in diversity issues were invited to help establish a dialog and spur discussion about how the results from this work can inform the physics education research community The organizers encouraged physics education researchers who are using research based instructional materials with non traditional students at either the pre college level or the college level to share their experiences as instructors and researchers in these classes

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