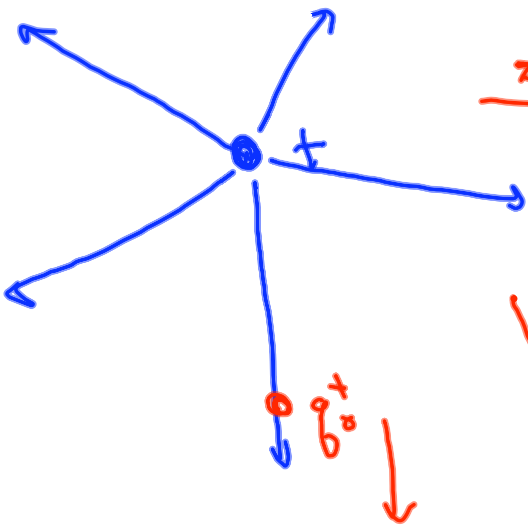
Reminders 2-14-08:
-Next Webassign Due February 20
-Electric Energy Conceptual Questions Due 2/26
-Start Reading Chapter 16

Objectives:
-More on Electrical Potential
-Capacitance
-Capacitors in Series and Parallel



$$\Delta EPE = q\,\Delta V$$

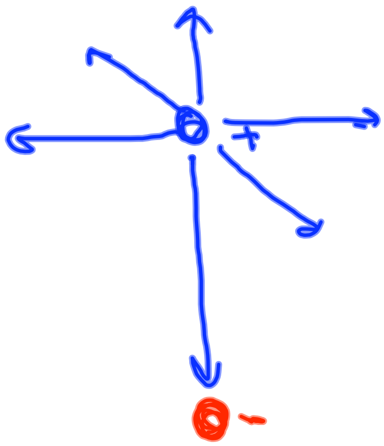
$$W_{field} = -\Delta EPE$$

$$= -(EPE_f - EPE_i)$$

$$= EPE_i - EPE_f$$

$$EPE_i - EPE_f = KE_f - KE_i$$

$$q[V_i - V_f] = KE_f - KE_i$$



$$W_{field} = -(EPE_f - EPE_i)$$
$$= EPE_i - EPE_f$$
$$EPE_i - EPE_f = KE_f - KE_i$$
$$q(V_i - V_f) = KE_f - KE_i$$
$$V_f > V_i$$

Sierra College

Physics 2B Old Exams

- Dominic Calabrese -

Home

Syllabus

Labs

P2Y Syllabus

Old Exams

Web Assign

Exams

Exam 1

Exam 2

Exam 3

Exam 4

Final Exam

OLD PROBLEMS

Note: The above sample exams were used in class periods that were 50 minutes in length. As a result, some of the exams were combined into one exam.

Exam 1 Crib Sheet

Exam 2 Crib Sheet

Exam 3 Crib Sheet

Exam 4 Crib Sheet

Final Exam Crib Sheet

Conceptual Questions

(to be assigned as needed)

Wave Motion & Sound

Electric Field

Electrical Energy

DC Circuits

Magnetic Fields

Faraday's Law

Geometric Optics

Physical Optics

Color and Light

Relativity and Nuclear Physics

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Office hours:TBA, or by appointment

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- Determine the number of electrons that pass between the terminals of a 9V battery when a when a 10 Watt lamp is on for 30 minutes.

$1\,W = 1\,\frac{J}{s}$ $\quad 30\,m \cdot 60\,\frac{s}{m} = 1800\,s$

$1800\,s \cdot 10\,\frac{J}{s} = 18{,}000\,J = q\,\Delta V$

$\Delta V = \frac{\Delta EPE}{q}$ $\quad q = \frac{18000\,J}{9} = 2000\,C$

$\#e = \frac{2000\,C}{1.6\times10^{-19}\,C/e} = 1.25\times10^{22}$ electrons

- One electron volt (eV) is the change in potential energy of an electron when it moves through a potential difference of 1 volt. What is the change in potential energy of an electron in a TV tube that is accelerated through a potential difference of 30,000V. Express your answer in electron volts (eV) and Joules.

$W = -\Delta EPE = KE_f - KE_i$

Change in potential energy of electron is $-30{,}000$ eV

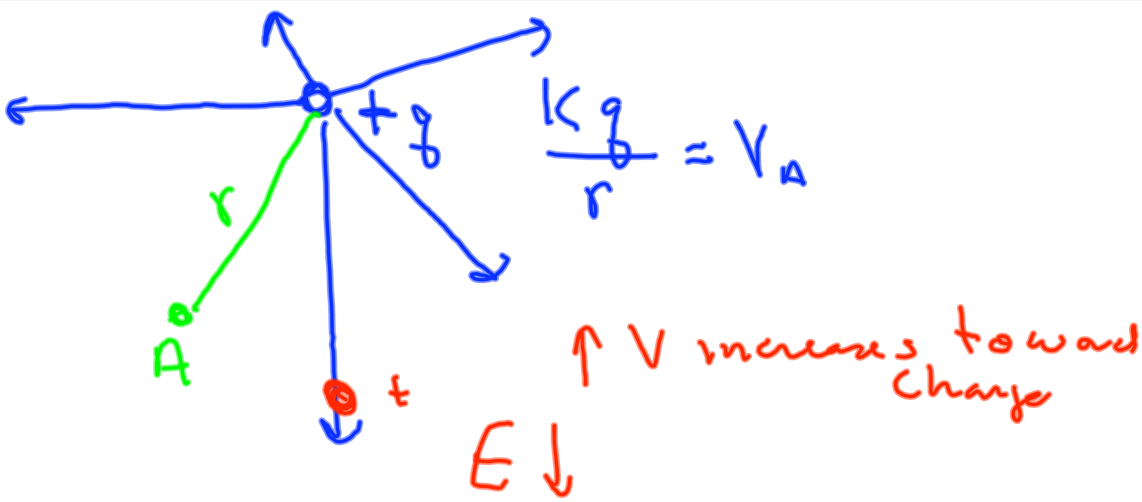
Electron moves from lower to higher

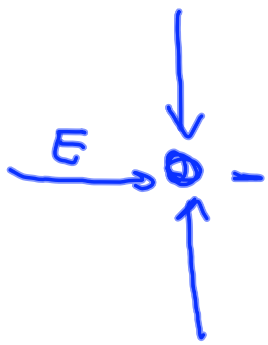
$\Delta EPE = q\Delta V$

To convert to Joules

$-30{,}000 \text{ eV} \cdot 1.6 \times 10^{-19} \frac{J}{eV}$

$= -4.8 \times 10^{-15}$ J

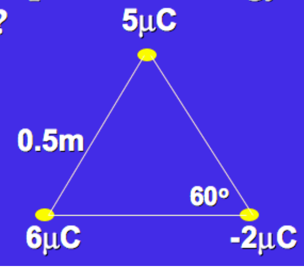

+q
r
A
+
$\frac{Kq}{r} = V_A$
↑ V increases toward charge
E ↓



$V = k\frac{q}{r}$

V increases away from charge

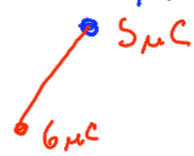
- **Suppose we place 3 charges in the corners of an equilateral triangle. What is the electrostatic potential energy of this group of charges?**



Answer: 0.14J

Bring in 1st charge from infinity
How much work is required (5μC).
zero!

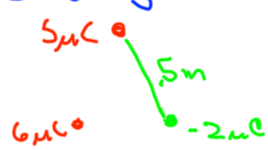
Bring in the 6μC charge.



$$EPE_f - EPE_i = \frac{k(6\mu C)(5\mu C)\times 10^{-12}}{0.5} - 0$$

$$= 0.54J$$

Now How much work is needed to bring in last charge?



$$\Delta EPE = \frac{k(6\mu C)(-2\mu C)10^{-12}}{0.5} + \frac{k(5\mu C)(-2\mu)10^{-12}}{0.5} - 0$$

$$= -0.396 J$$

Add all up

$0.54J + -0.396J = .14J$

$$\frac{Kq_1q_2}{r_{12}} + \frac{Kq_1q_3}{r_{13}} + \frac{Kq_2q_3}{r_{23}} = EPE$$