## Electric Potential

1. Two oppositely charged, parallel plates have a potential difference of 15.0 Volts. If the separation distance between the plates is 3 cm , what is the electric field between the plates?
2. An electron is accelerated through a 5 volt potential difference.
a. How much potential energy is converted to kinetic energy?
b. How fast would the electron be traveling at the end if the motion if it started at rest?
3. What is the electric potential at a point 5 cm from a $+4.0 \mu \mathrm{C}$ charge?
4. $\quad \mathrm{A}+3.0 \mu \mathrm{C}$ charge is placed in the same region as a $-1.0 \mu \mathrm{C}$ charge. Answer \#4 on separate paper
a. Sketch the electric field lines in the region. (Keep track of the number of lines on each charge.)
b. Draw at least five equipotential surfaces. (Draw the equipotential surfaces as dotted line to differentiate these from the electric field lines.)
5. Point A is 15 cm from a $+2 \mu \mathrm{C}$ point charge, while point B is 5 cm away.
a. What is the electric potential difference between points A and B ?
b. How much work would you have to do in order to move $\mathrm{a}+4 \mu \mathrm{C}$ charge from point A to point B ?
6. 



Above is an equipotential map for some arrangement of charges.
a. Label the potential for each line that is not already labeled.
b. What is the electric potential energy for $a+3 \mu \mathrm{C}$ charge that is placed at point L ?
c. Indicate on the map the direction a positive charge would be pushed if it was placed at point M.
d. What is the potential difference between:
i. points N and P ?
ii. points L and O ?
e. How much work would be done in moving a $+3 \mu \mathrm{C}$ charge from P to N ?
f. How much work would be done in moving a $+3 \mu \mathrm{C}$ charge from M to N ?
g. Which direction would an electron travel, from $P$ to $L$ or from $L$ to $P$ ? Explain.

