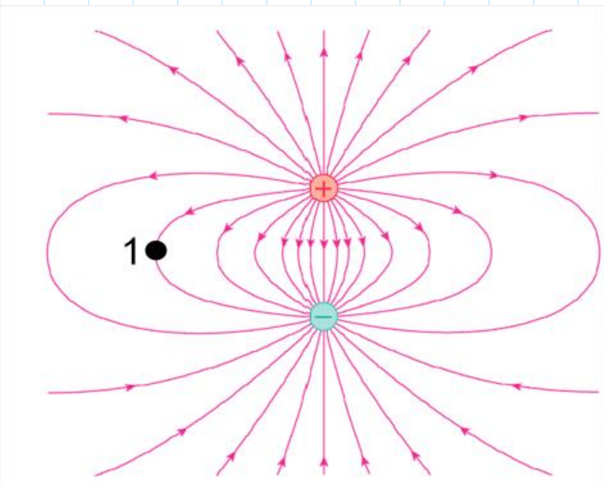
Phy 2B 3/23

Monday, March 23, 2015 8:58 AM

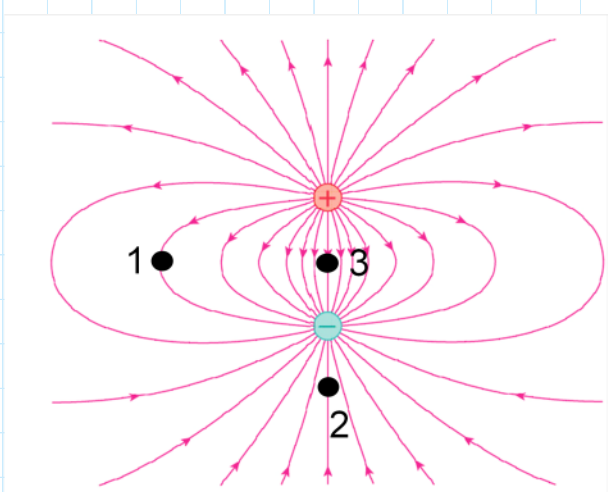
Ch 16 - skip area + volume expansion
17 - skip RMS speed, 17.3
18 - skip 18.4
19 - skip 19.7
22 - skip paramagnetism & diamagnetism (in 22.8)



What is the direction of the electric force on a ***negative*** test charge at point 1?

1.
2.
3.
4.
5. The net electric force is zero at point 1

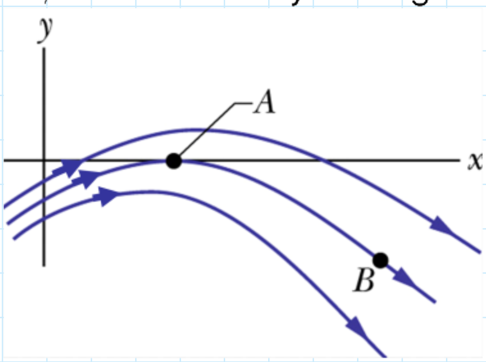
Rank the magnitude of the electric field at positions 1, 2, and 3?



1. 1>2>3
2. 1<2<3
3. 2<1<3
4. 1=2<3

3. 2<1<3
4. 1=2<3
5. 1>2=3
6. 1=2=3

At which point, A or B, will the magnitude of the acceleration of a ***negative*** test charge be greater if the charge is released from rest, and which way will it go?

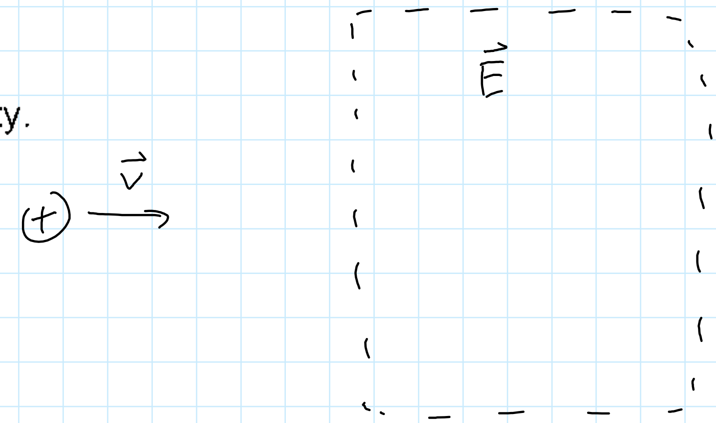


E Field Lines

1. A and in the direction of the field lines.
2. A and opposite to the field line directions.
3. B and in the direction of the field lines.
4. B and opposite to the field line directions.
5. The accelerations are the same.

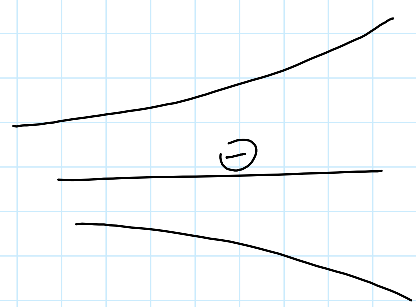
A positive charge moving at constant velocity enters a region with uniform electric field. Neglecting other forces, the charge ***always*** will

1. Keep moving with a constant velocity.
2. Speed up.
3. Slow down.
4. Move in a circle.
5. None of the above.



A negative charge, which is free to move, is released from rest in an electric field. Neglect non-electrical forces. It will ***always*** move to a position with:

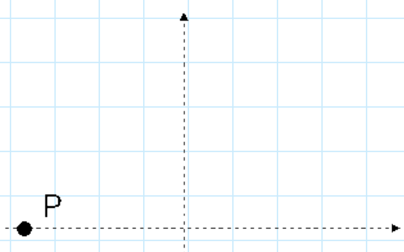
1. higher potential.
2. lower potential.
3. Electric field with higher magnitude.
4. Electric field with lower magnitude.
5. Larger electrical force.
6. Smaller electrical force.



A charge is released from rest in an electric field. Neglect non-electrical forces. Independently of the sign of the charge, it will ***always*** move to a position :

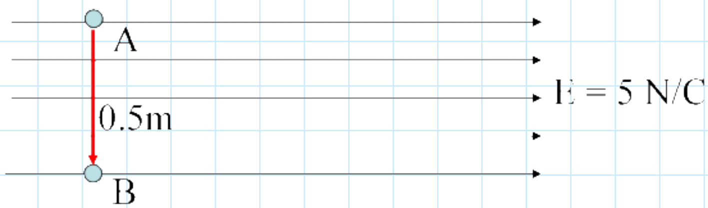
1. With higher potential.
2. With lower potential.
3. Where it has higher potential energy.
4. Where it has lower potential energy.
5. Where the electric field has higher magnitude.
6. Where the electric field has lower magnitude.

A proton is placed at position P on the x axis where the potential is -10V. Which of the following statements is true?



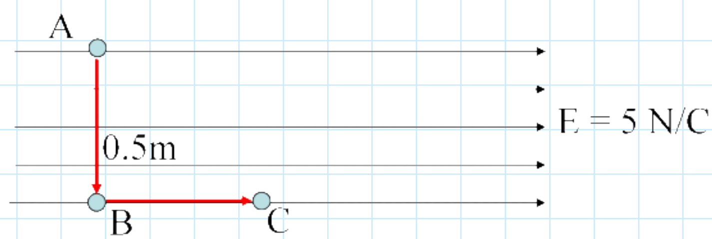
1. The proton will move to the -x direction.
2. The proton will move to the +x direction.
3. The proton will not move at all.
4. The motion can not be predicted.

A ***negative*** test charge Q = -0.6C was moved from point A to point B In a uniform electric field E=5N/C. The test charge is ***at rest*** before and after the move. The distance between A and B is 0.5m and the line connecting A and B is perpendicular to the electric field. How much work was done by the net external force while moving the test charge from A to B?



1. 1.5J
2. 0J
3. –1.5J
4. 3.0J
5. –3.0J

After moving the -0.6C test charge from A to B, it was then moved from B to C along the electric field line. The test charge is ***at rest*** before and after the move. The distance between B and C also is 0.5m. How much work was done by the net external force while moving the test charge from A to C?

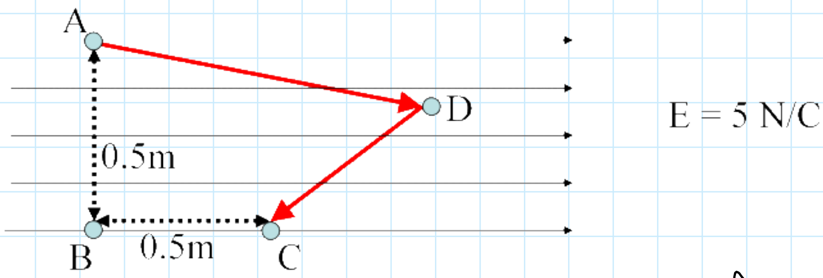


1. 1.5J
2. 0J
3. –1.5J
4. 2.12J
5. –2.12J
6. 3.0J
7. -3.0J

E=5N/C

$$W = F d (\cos 0^\circ)$$
$$= qE d$$
$$= (0.6\ C)(5\ \frac{N}{C})(0.5\ m)$$
$$= 1.5\ J$$

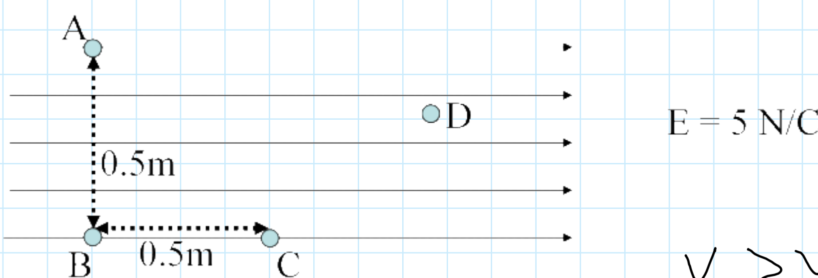
Instead of moving the test charge from A to B then to C, it is moved from A to D and then back to C. The test charge is ***at rest*** before and after the move. How much work was done by the net external force while moving the test charge this time?



1. 1.5J
2. 0J
3. –1.5J
4. Infinitely big
5. Do not know at this time.

Electric force is conservative
work is same for all paths

+1.5 J of work was done by the net external force while moving the -0.6 C test charge from B to C. The test charge is ***at rest*** before and after the move. What is the voltage difference between B and C, and at which point is the voltage larger?



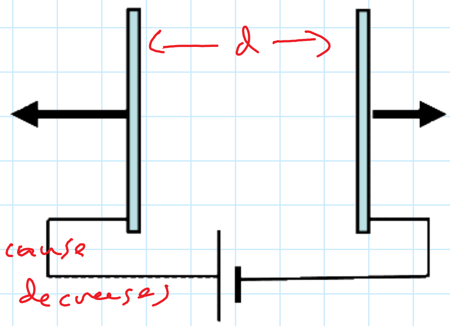
1. 2.5 V, voltage higher at B.
2. 2.5 V, voltage higher at C.
3. 0.9 V, voltage higher at B.
4. 0.9 V, voltage higher at C.
5. 1.5 V, voltage higher at B.
6. 1.5 V, voltage higher at C.

$V_B > V_C$

E points to lower potential

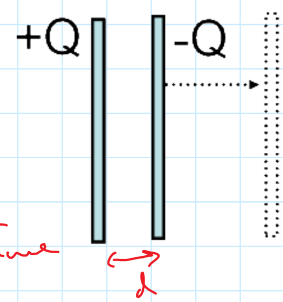
$\Delta V = E d$
$= 5\ (0.5)$
$= 2.5\ V$

The distance between two parallel plates is increased ***while they remain hooked to a battery***. Which one of the following statement is true?



1. The voltage between the plates will decrease. *Stays the Same*
2. The electric field between the plates will increase. *decreases because Q decreases*
3. The charge on the plates will decrease.
4. The capacitance of these two plates will increase. *C decreases because d increases*
5. None of the above.

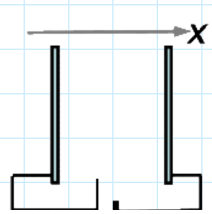
Two parallel plates are charged to +Q and –Q using a battery, and then the battery is ***removed***. Subsequently, the distance between these isolated plates is increased as shown. Which of the following statement is true?



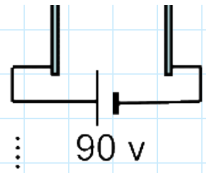
$Q = C \Delta V$

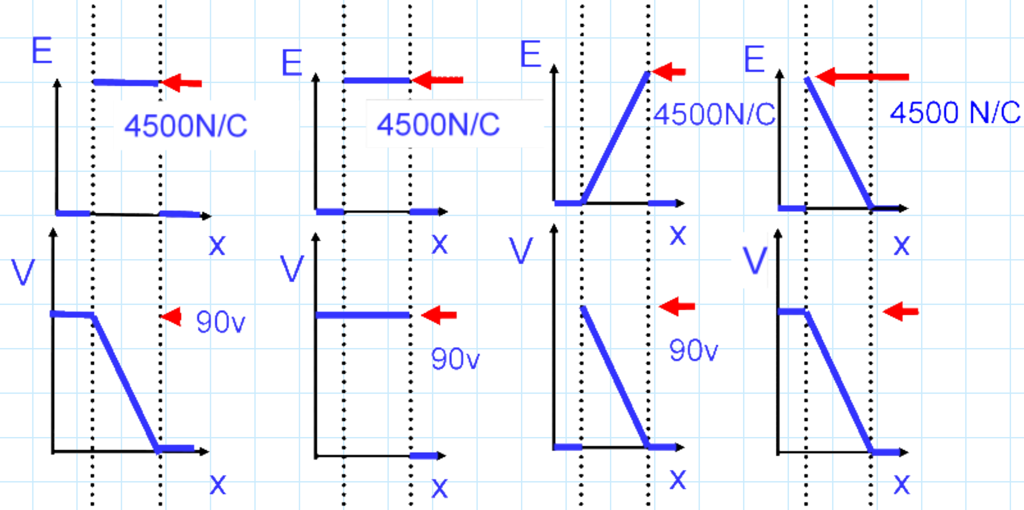
1. The voltage between the plates will increase.
2. The electric field between the plates will decrease. *E same since Q same*
3. The capacitance between the plates will increase. *C decreases since d increases*
4. The charge on the plates will decrease. *Q stays the same*
5. None of the above.

Select the correct plots of E and V versus distance between two parallel plates of a capacitor: (The plates are 2 cm apart.)

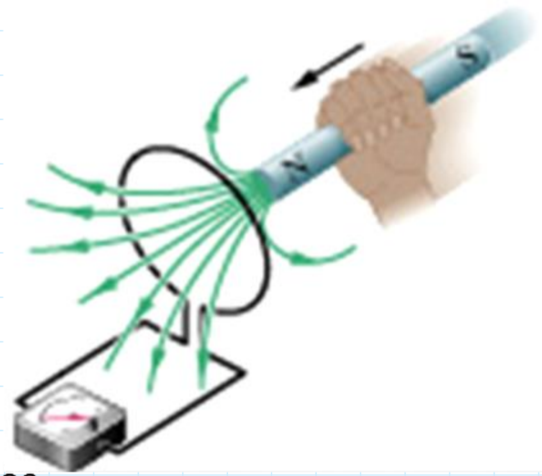


distance between two parallel plates of a capacitor: (The plates are 2 cm apart.)



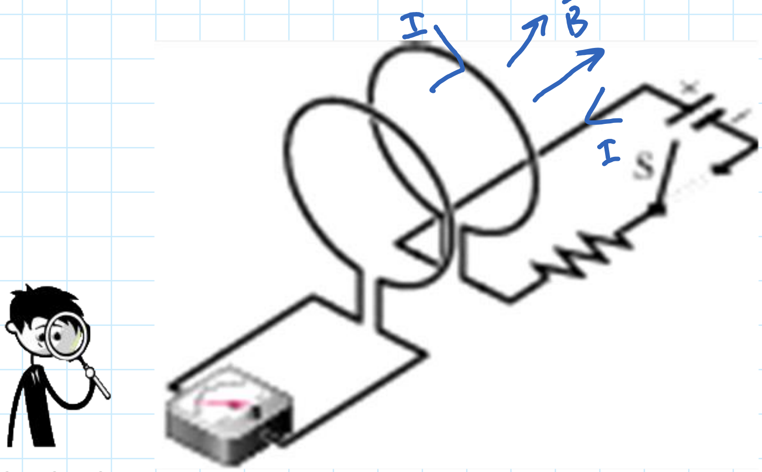


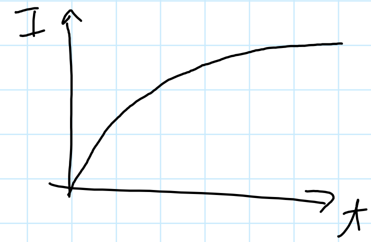
You move the north end of a magnet toward a loop as shown. What will be the direction of the induced current viewed from the meter side?

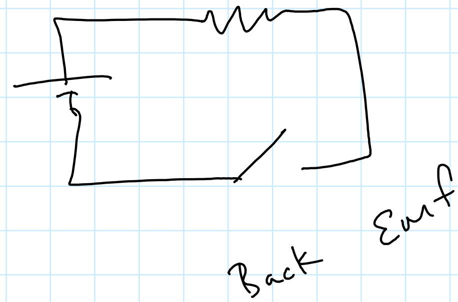


1. Clockwise
2. Counter Clockwise
3. No current

Immediately after you close the switch, what will be the direction of the induced current, again viewed from the meter side?

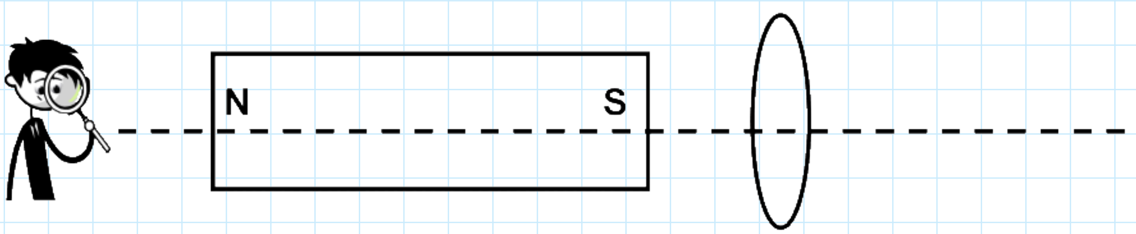






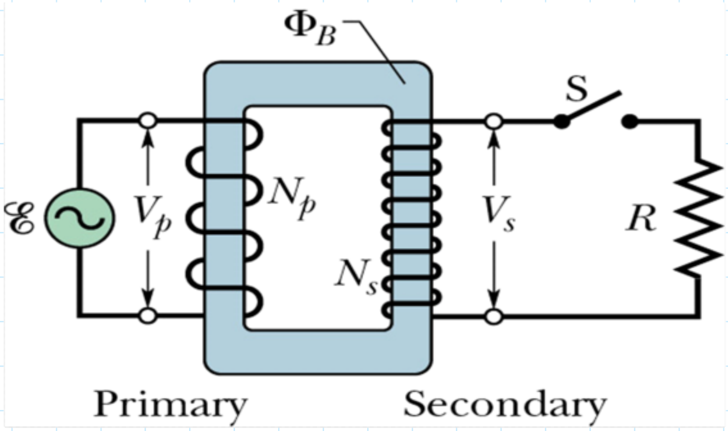
1. Clockwise
2. Counter Clockwise
3. No current

Initially, the magnet and the loop are not moving. Then, the loop starts to rotate around its center (denoted by the dotted line). The rotation is clockwise when viewed from the magnet side. What will be the direction of the induced current in the loop when viewed from the magnet side?



1. Clockwise
2. Counter Clockwise
3. No current

An ideal transformer is shown below. The voltage on the primary circuit is 10V. The primary circuit has 4 turns, the secondary circuit has 8 turns. What is the voltage on the secondary circuit.



$$V_p = \frac{N_p}{N_s} V_s$$

$$I_p = \frac{N_s}{N_p} I_s$$

1. 5V
2. 2.5V
3. 10V
4. 20V
5. 40V

An ideal transformer is shown below. The current in the primary circuit is 10mA. The primary circuit has 4 turns, the secondary circuit has 8 turns. What is the current in the secondary circuit.

1. 5mA
2. 2.5mA
3. 10mA
4. 20mA
5. 40mA

An ideal transformer (no power loss) is shown below. The primary circuit has 4 turns, the secondary circuit has 8 turns. What is the ratio of the power dissipated in the primary circuit and the power dissipated in the secondary circuit?

1. 1:1
2. 1:2
3. 2:1
4. 1:4
5. 4:1