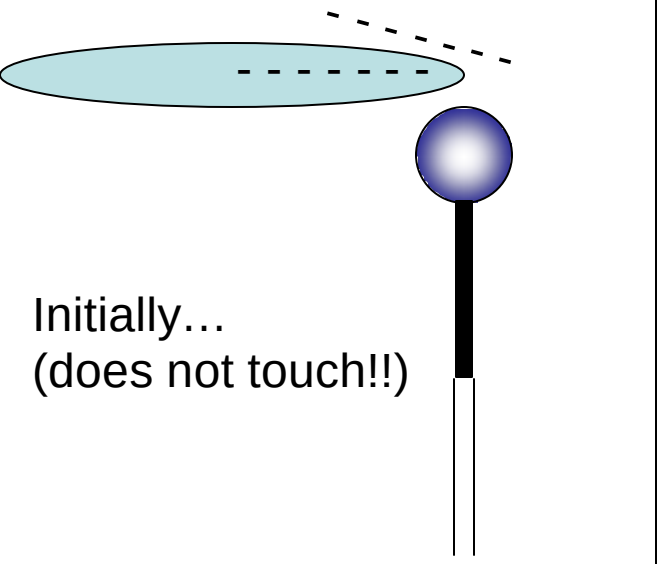
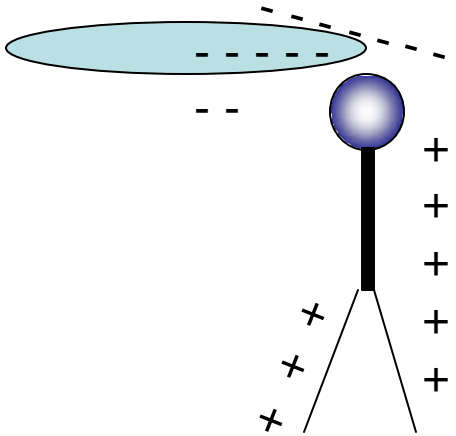


Initially…
(does not touch!!)

A



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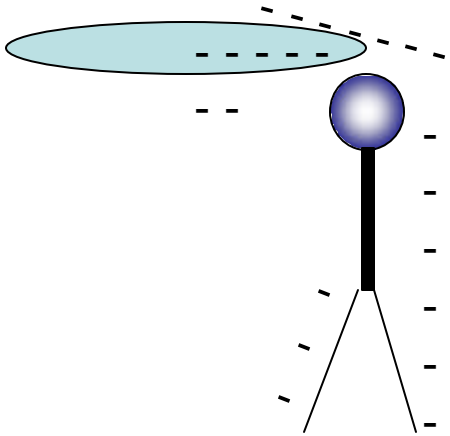

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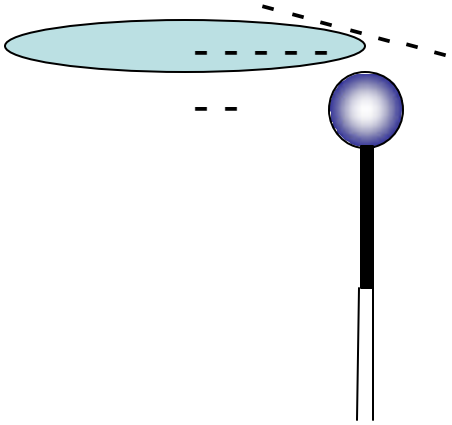
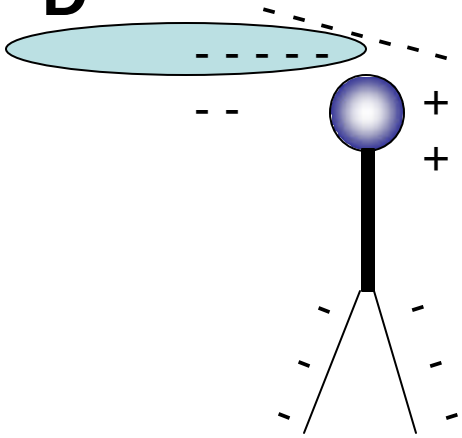
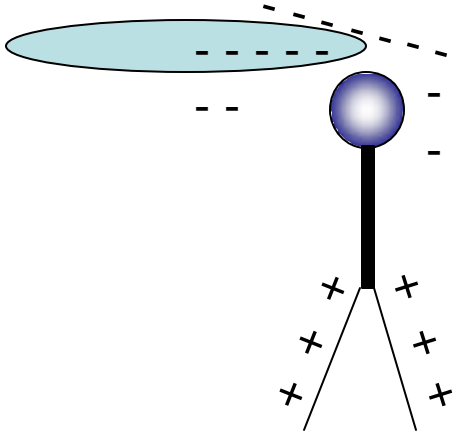
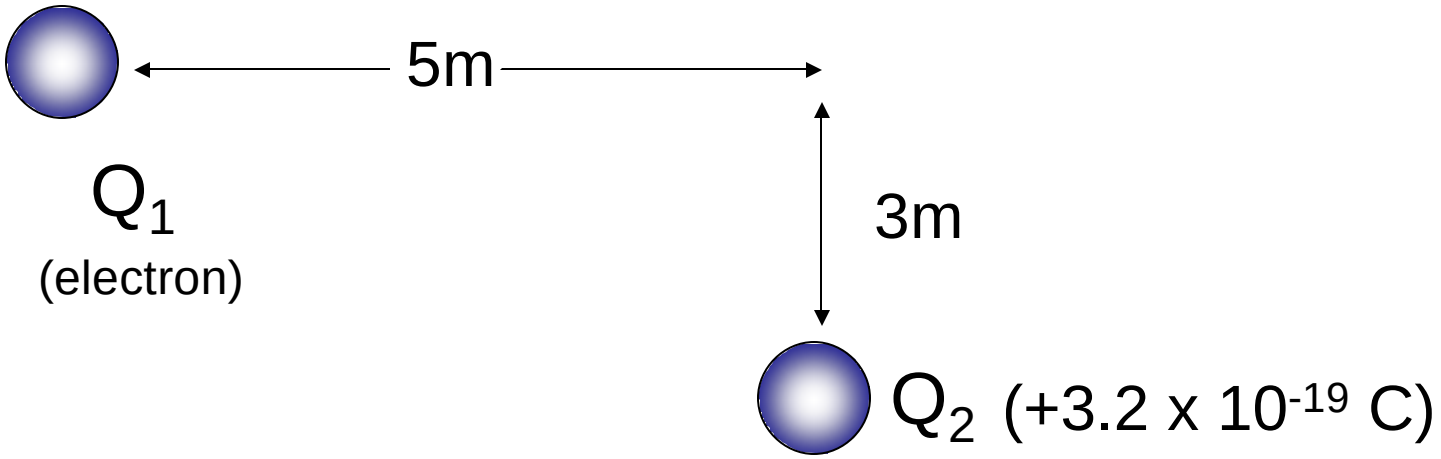


D



E





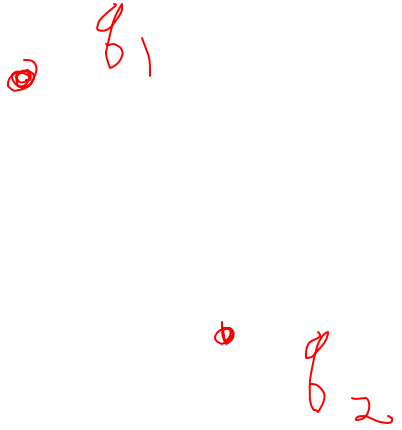
What is F on Q_1 due to Q_2?

A	-1.36E-29
B	1.33E-50
C	1.36E-29
D	1.84E-29
E	5.12E-29

N

F_{12}'s direction?

q_1 and q_2 are positive charges!!!



A) $\vec{r}_{21}$

B) $-\vec{r}_{21}$

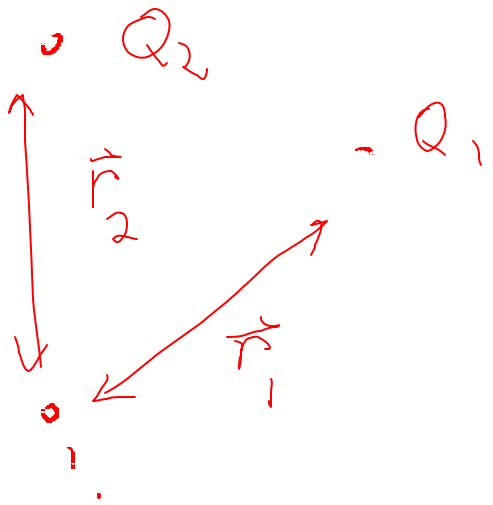
C) $\vec{r}_{12}$

When the electric charge on each of two charged particles is doubled, the electric force between them is

A)Doubled
B)Quadrupled
C)Halved
D)The Same
E)None of the above

What is magnitude of E at point P?

Q_1 and Q_2 are point charges

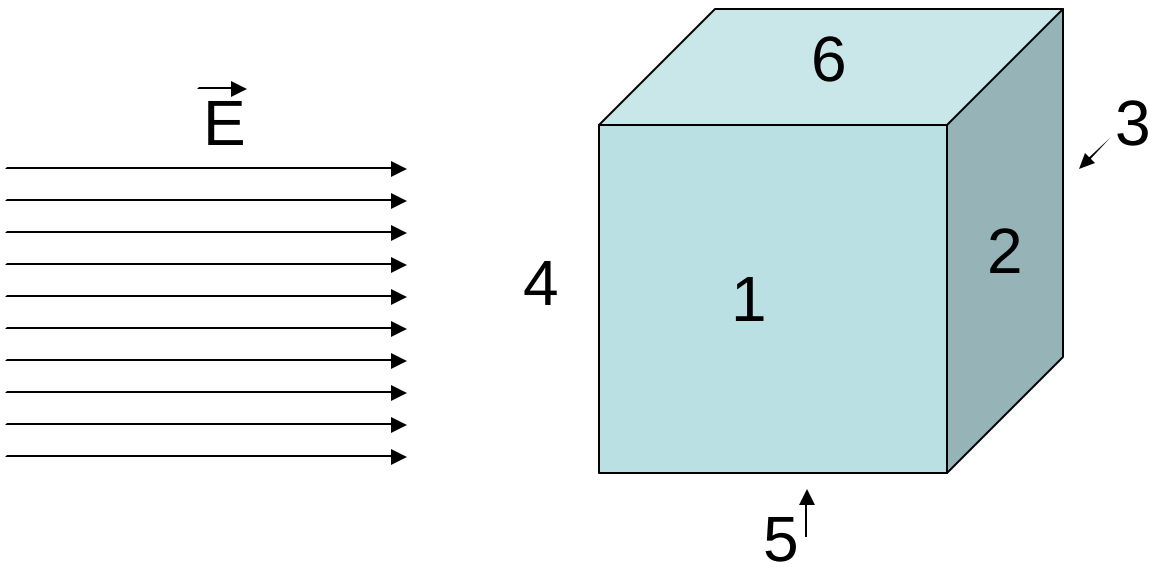


A) $E = \frac{1}{4\pi\varepsilon_0}\left[\frac{q_1 q_2}{r_1 r_2}\right]$

B) $E = \frac{1}{4\pi\varepsilon_0}\left[\frac{q_1^2}{r_1^2} + \frac{q_2^2}{r_2^2}\right]$

C) $E = \frac{1}{4\pi\varepsilon_0}\left[\frac{q_1}{r_2^2} + \frac{q_2}{r_1^2}\right]$

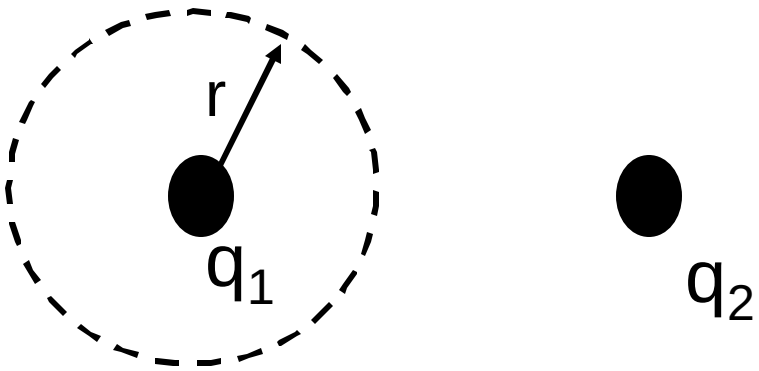
D) $E = \frac{1}{4\pi\varepsilon_0}\left[\frac{q_1}{r_1^2} + \frac{q_2}{r_2^2}\right]$



Closed Square Surface

List all sides for which the electric flux, Φ_E, is zero.

A) 1,2,3,4
B) 5,6
C) 1,3,5,6
D) 2,4,5,6
E) 1,2

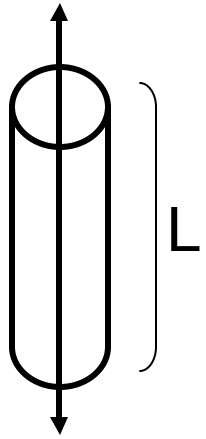


To calculate E(r) due to q_1 and q_2 you would:

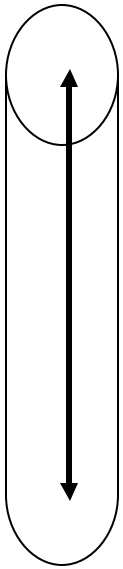
A) Use Gauss' Law with surface shown
B) Not use Gauss' Law

What is the best Gaussian surface to use to calculate E at some radius from an infinite line of charge?

A)

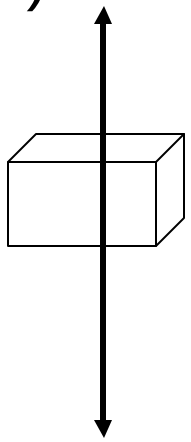


B)



Infinitely long cylinder

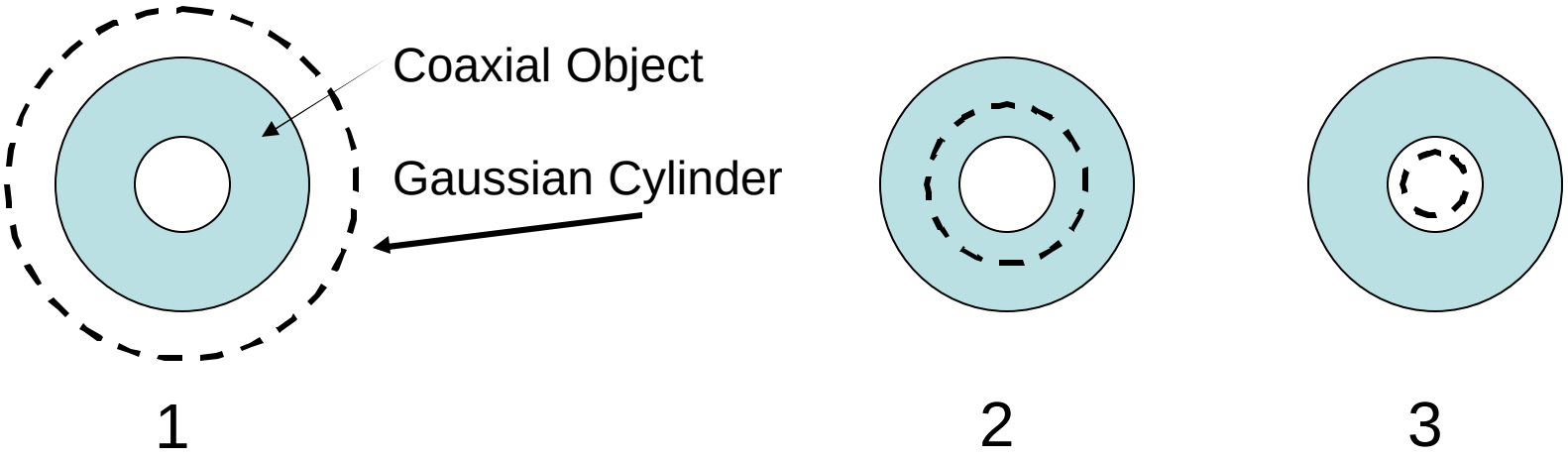
C)



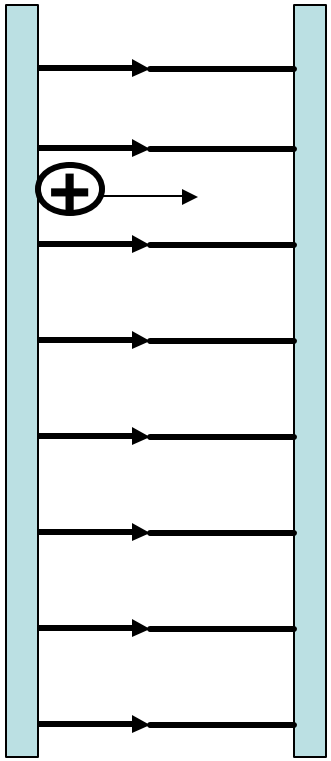
Box, sides of length L

D) Something Completely Different!

Which Gaussian Surfaces Are Illegal?

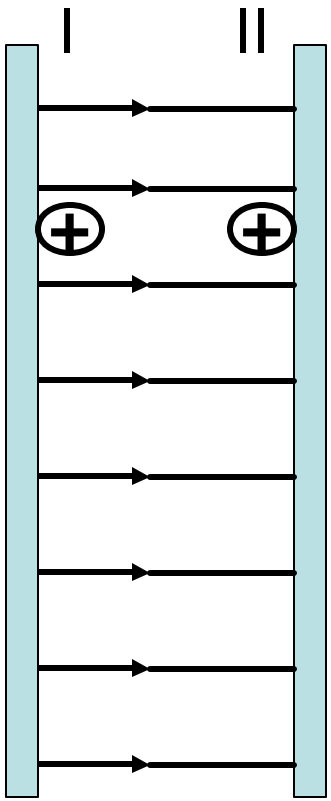


A) 2
B) 1 and 3
C) 1, 2, and 3
D) 2 and 3
E) All Legal



The Positive charge moves from the left to the right. What is the sign of the work that the Electric Field does on the charge?

A) No Work
B) E Field does Positive Work
C) E Field does Negative Work

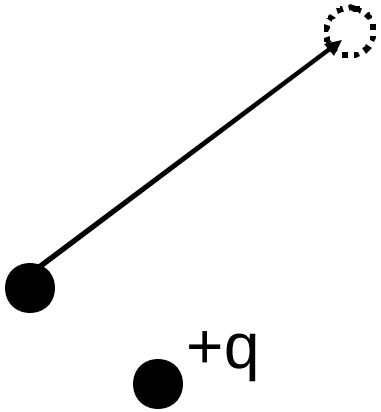


Which charge has Greater Potential Energy?

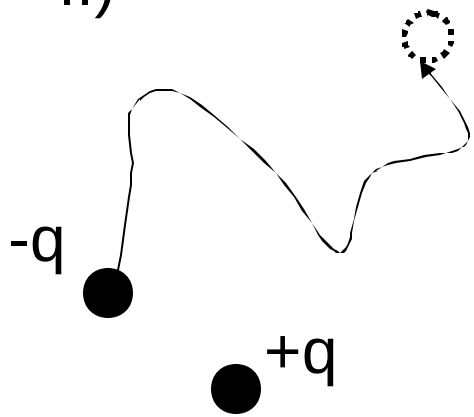
A) I
B) II
C) They are the same

Which one requires the most work?

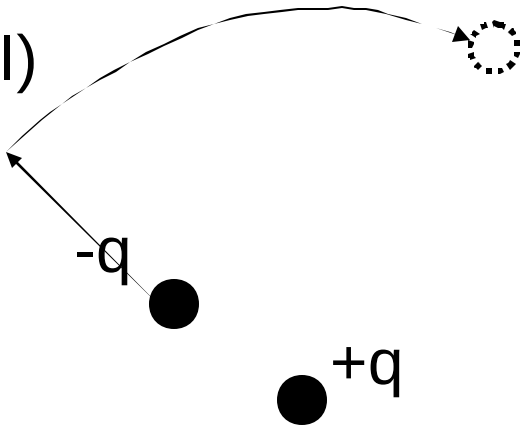
I)



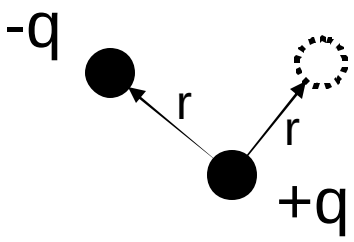
II)



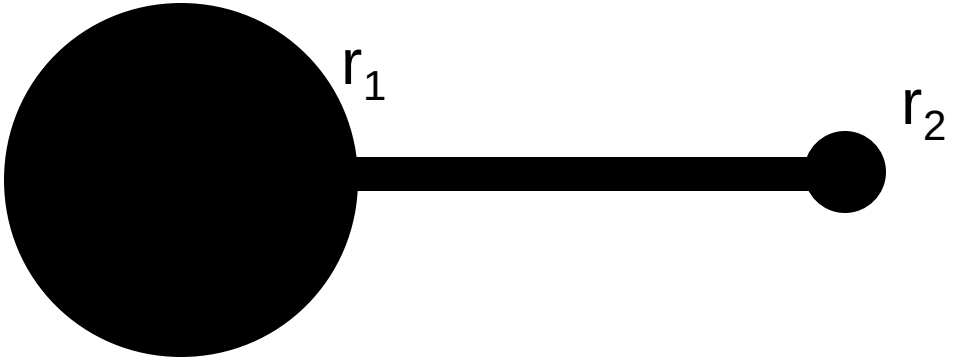
III)



VI)



A)I and II
B)I and II and III
C)II and II
D)VI
E)All are same

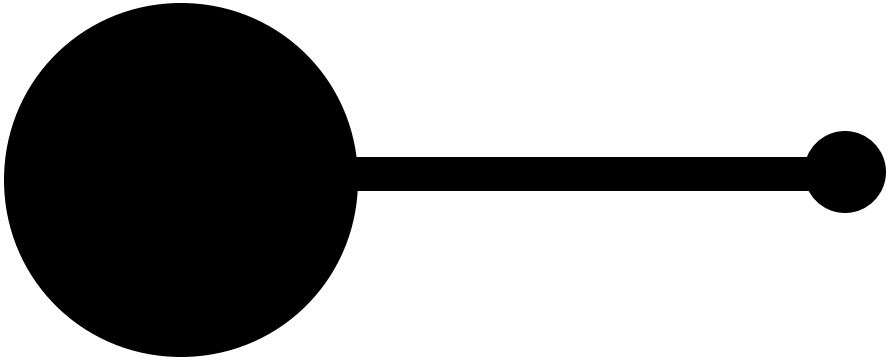


Two conductors, radius r_1 and r_2 – connected together

Total charge Q is added to conductor 1.

What can you say about Electric Potential of 1 and 2, V_1 and V_2?

A) $V_1 > V_2$
B) $V_1 < V_2$
C) $V_1 = V_2$

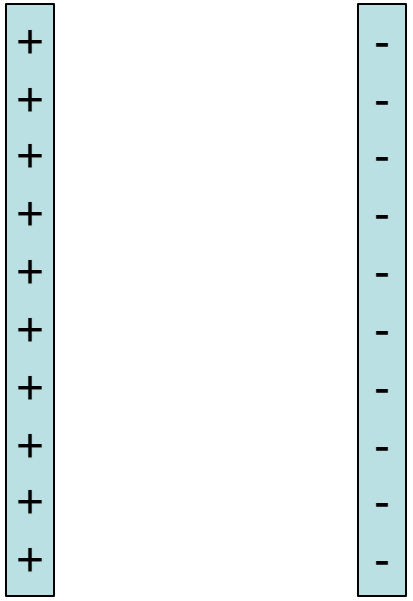


Two conductors, radius r_1 and r_2 – connected together

Total charge Q is added to conductor 1.

How much charge is on conductor 1?

A)½ Q
B)$Qr_2/(r_1+r_2)$
C)r_1/r_2Q
D)$Q(r_1+r_2)/r_1$
E)$Qr_1/(r_1+r_2)$

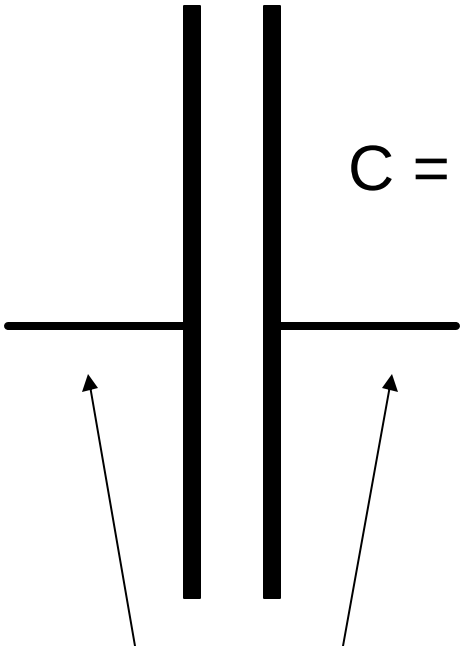


10 F parallel Plate Capacitor

Charged up with 500 V

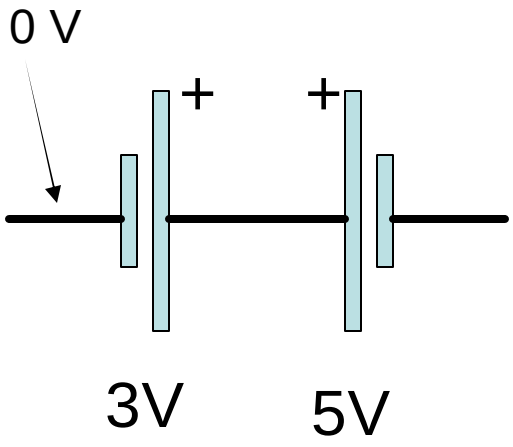
What is PE of the Capacitor?

A) 1.33×10^3 J
B) 1.5×10^4 J
C) 2.2×10^4 J
D) 1.3×10^6 J
E) 7.3×10^7 J



How much energy is stored in the Capacitor?

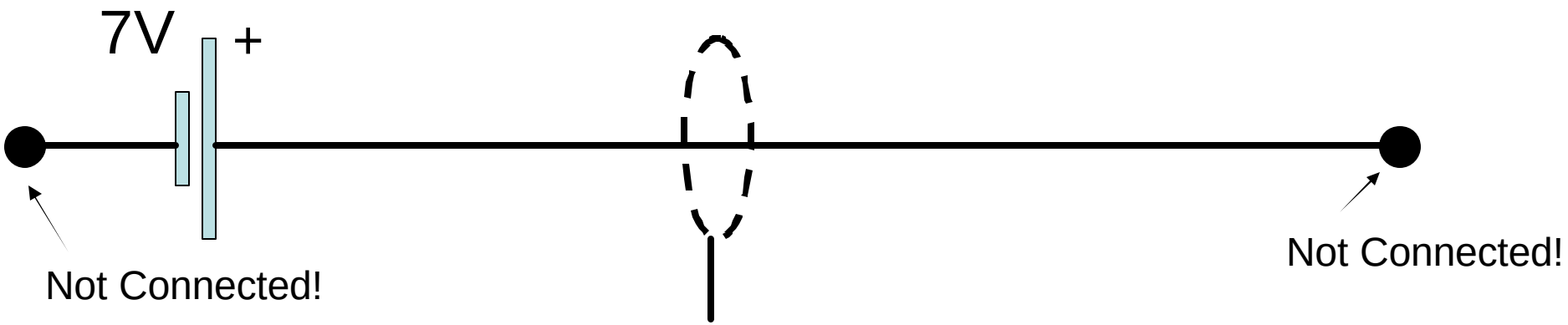
A) 10 J
B) 40 J
C) 4300 J
D) 1.6×10^8 J
E) 2.3×10^9 J



The left side is grounded, and has a voltage of zero!

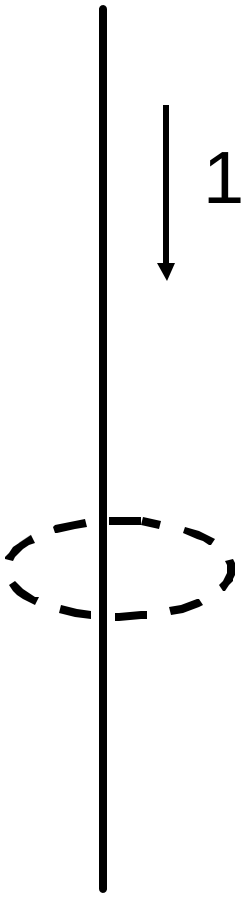
What is ΔV across these two batteries?

A) -8 V
B) -3 V
C) -2 V
D) 5 V
E) 8 V



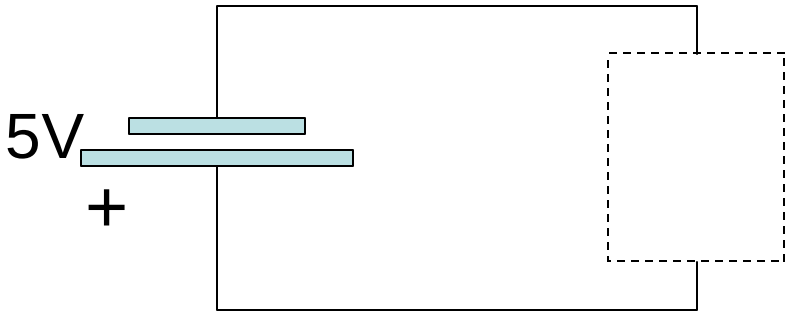
Are there any charges flowing through this loop?

A) Yes
B) No
C) Can’t Tell



In 1.5 seconds how much charge flowed through the loop?

A) 0.89 C
B) 1.1 C
C) 1.6 C
D) 2.6 C
D) 3.1 C



1.2 μA flows through the wire

What is the resistance in the dotted box?

A) 2.4×10^{-7}
B) 6×10^{-6}
C) 4.2×10^{6}
D) 4.2×10^{9}

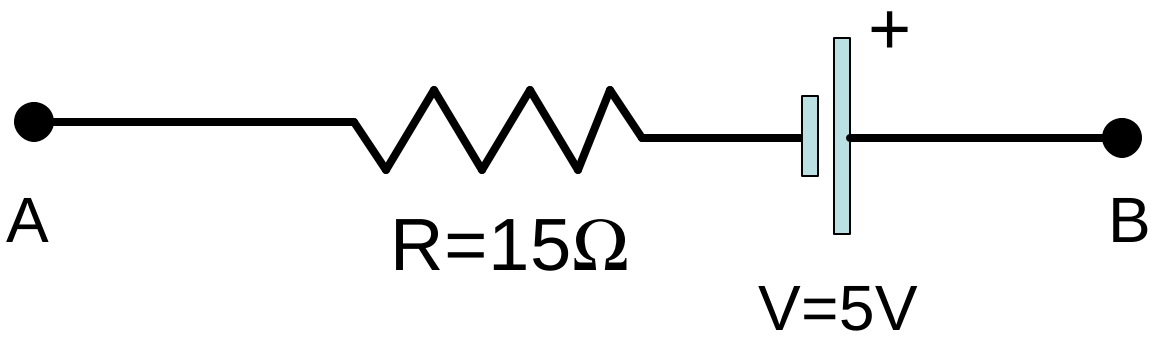
(Ω)

Very long wire of length L. Radius is 1mm. Made out of copper

$\rho = 1.68 \times 10^{-8}\ \Omega m$

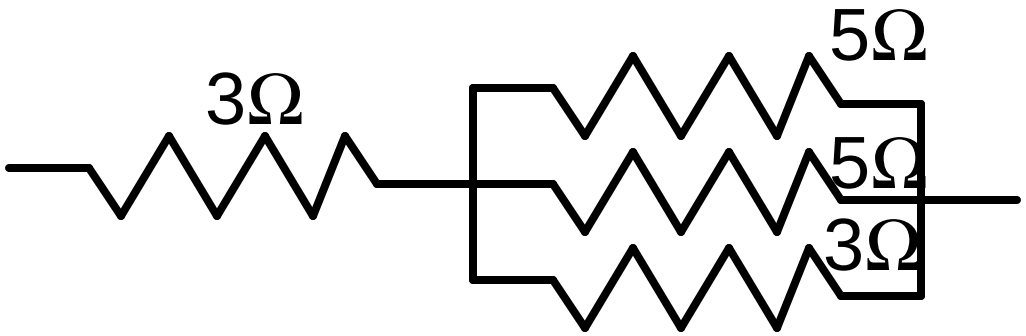
If the total resistance of the wire is measured to be 2 Ω, what is L?

A) 1.9×10^{2} m
B) 3.7×10^{2} m
C) 7.5×10^{5} m
D) 1.5×10^{9} m



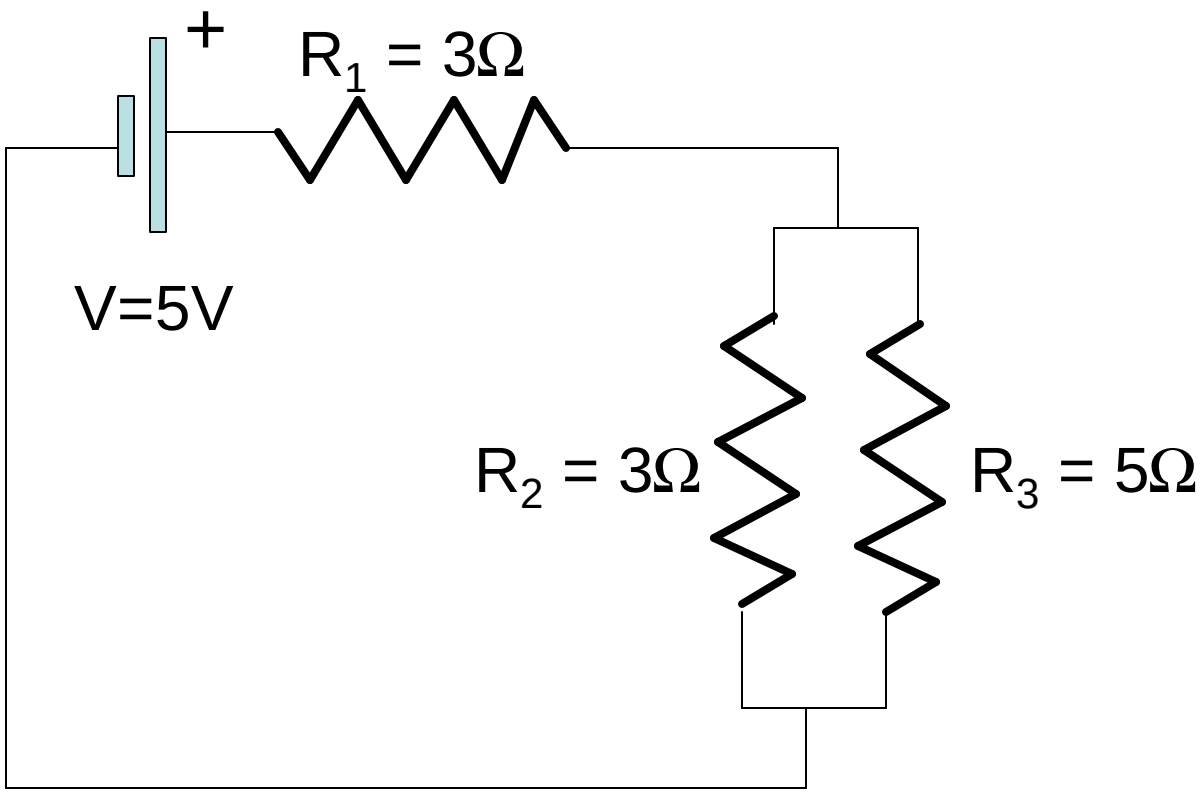
What is $|V_{AB}|$?

A) 1V
B) 3V
C) 5V
D) 20V
E) Can't Calculate This!



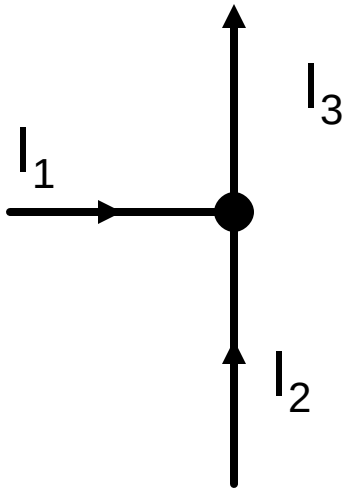
What is R_{eq}?

A) 2.4 Ω
B) 3.7 Ω
C) 4.4 Ω
D) 16 Ω



What is the voltage drop across R_2?

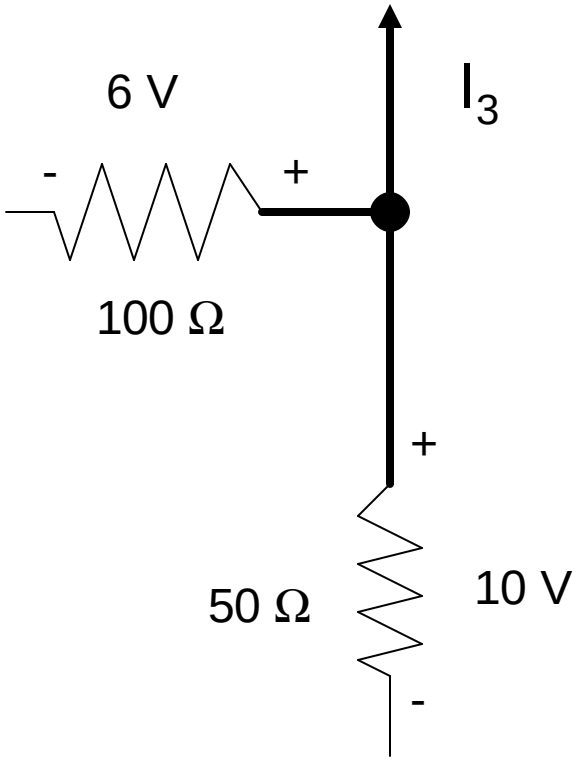
A) 1.4 V
B) 1.9 V
C) 2.5 V
D) 3.1 V
E) 4.3 V



$I_1 = 5A$
$I_2 = 7A$

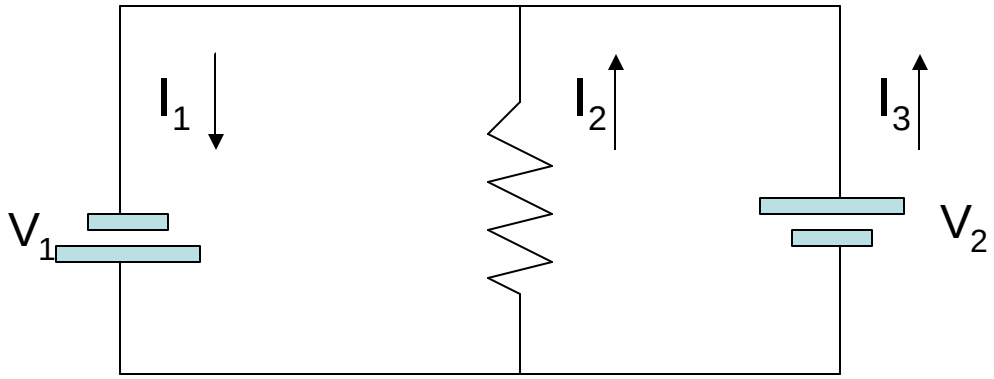
$I_3 = ?$

A) 2 A
B) 5 A
C) 6 A
D) 7 A
E) 12 A



A) 0.11 A
B) 0.26 A
C) 1.5 A
D) 12 A
E) 16 A

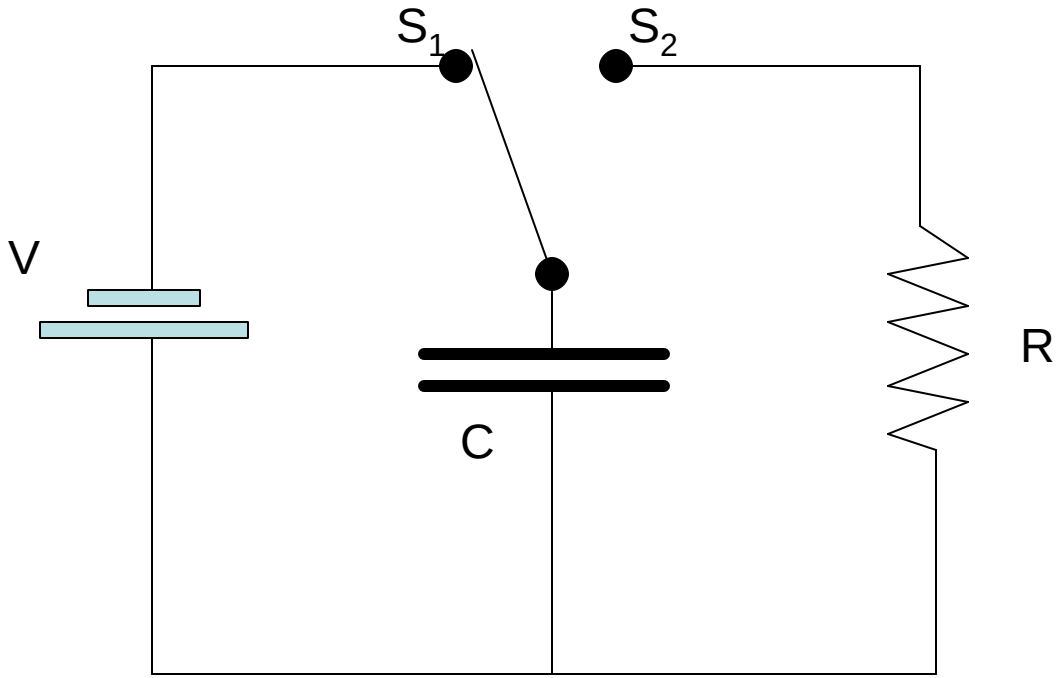
What is I_3?



$V_1 - I_2R = 0$ is a valid K's rule. What are the other possibilities?

I) $V_1 + V_2 = 0$
II) $V_2 + I_2R = 0$
III) $V_2 - I_2R = 0$
IV) $V_1 - I_2R = 0$

A) I
B) I & IV
C) I & II & III
D) I & II & IV
E) III & IV



At t=0, switch is switched from S_1 to S_2.
What is the current through R right afterwards?

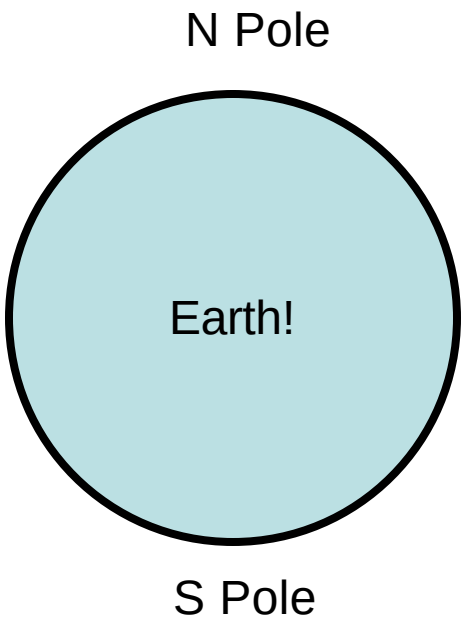
A) Q^2/C
B) V/R
C) $V/Re^{-1/RC}$
D) $V/R-Q/C$

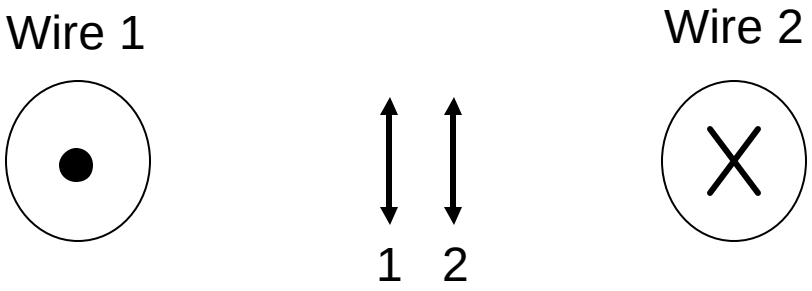
The wall is 120 V. What is the peak voltage?

A) 110 V
B) 120 V
C) 140 V
D) 170 V
E) 190 V

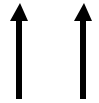
Is the north pole of the earth:

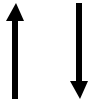
A) Magnetic North
B) Magnetic South
C) Neither

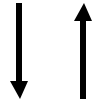


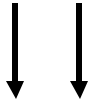


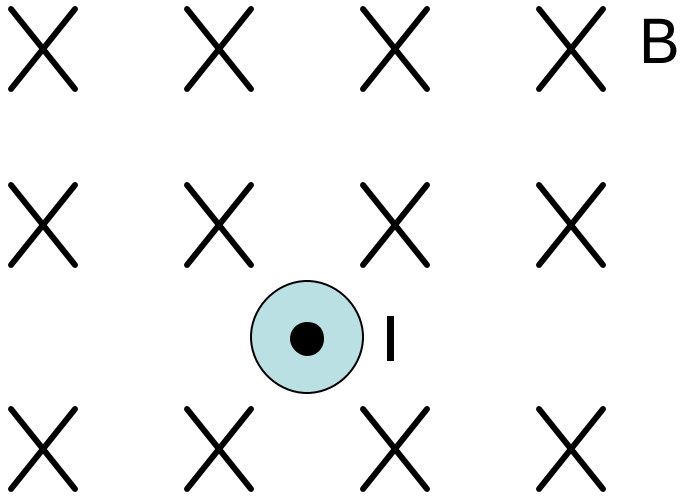
What is the correct orientation of the two arrows, due to each current carrying wire?

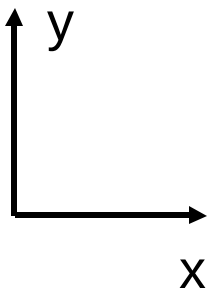
A) 

B) 

C) 

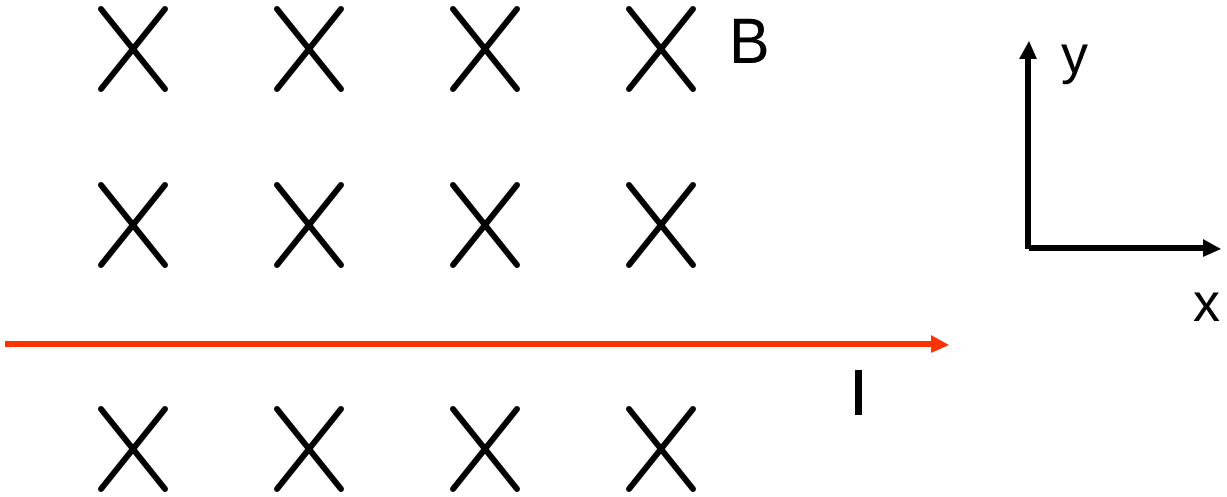
D) 





I into page, B out of page. Which direction will the wire feel a force in?

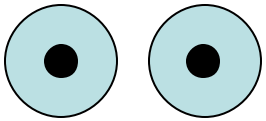
A) +x
B) +y
C) -x
D) -y
E) None of the Above

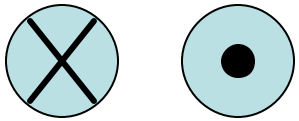


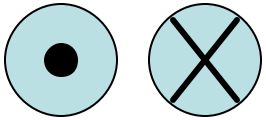
I into page, B out of page. Which direction will the wire feel a force in?

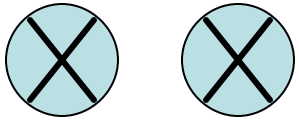
A) +x
B) +y
C) -x
D) -y
E) None of the Above

Which direction should current flow in each so they are mutually attracted to each other?

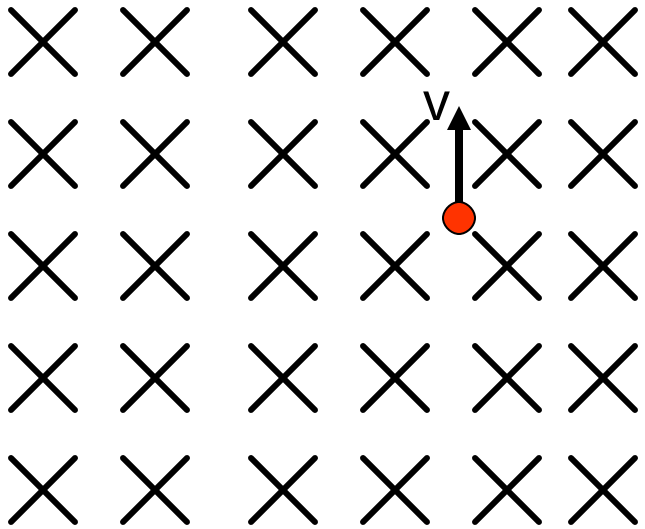
A) 

C) 

B) 

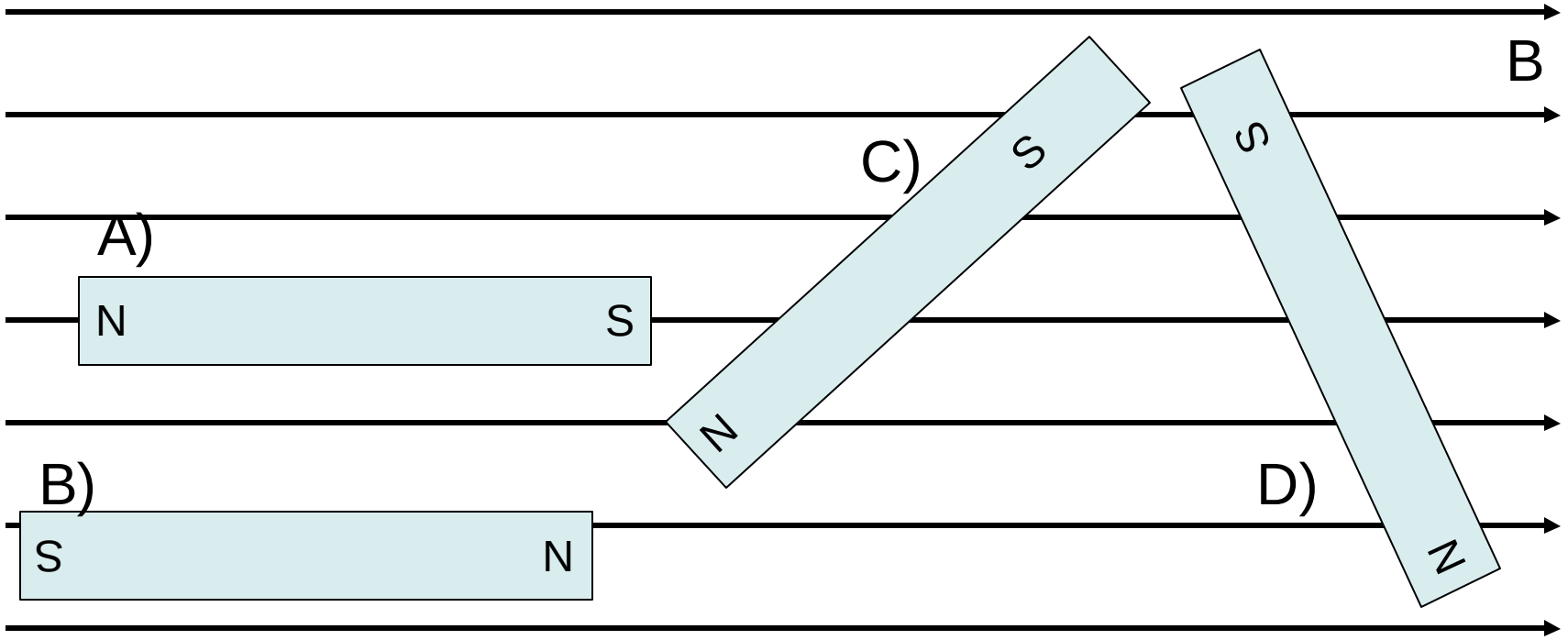
D) 

E) Not possible!

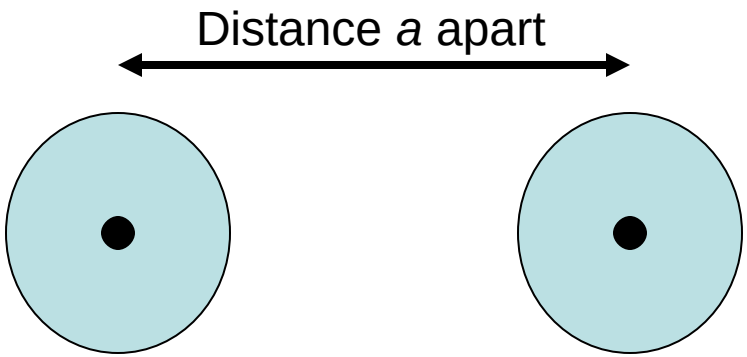


Positive charged particle moves with a speed v.
What direction is the Magnetic Force?

A) Up
B) Down
C) Left
D) Right
E) Out of Page



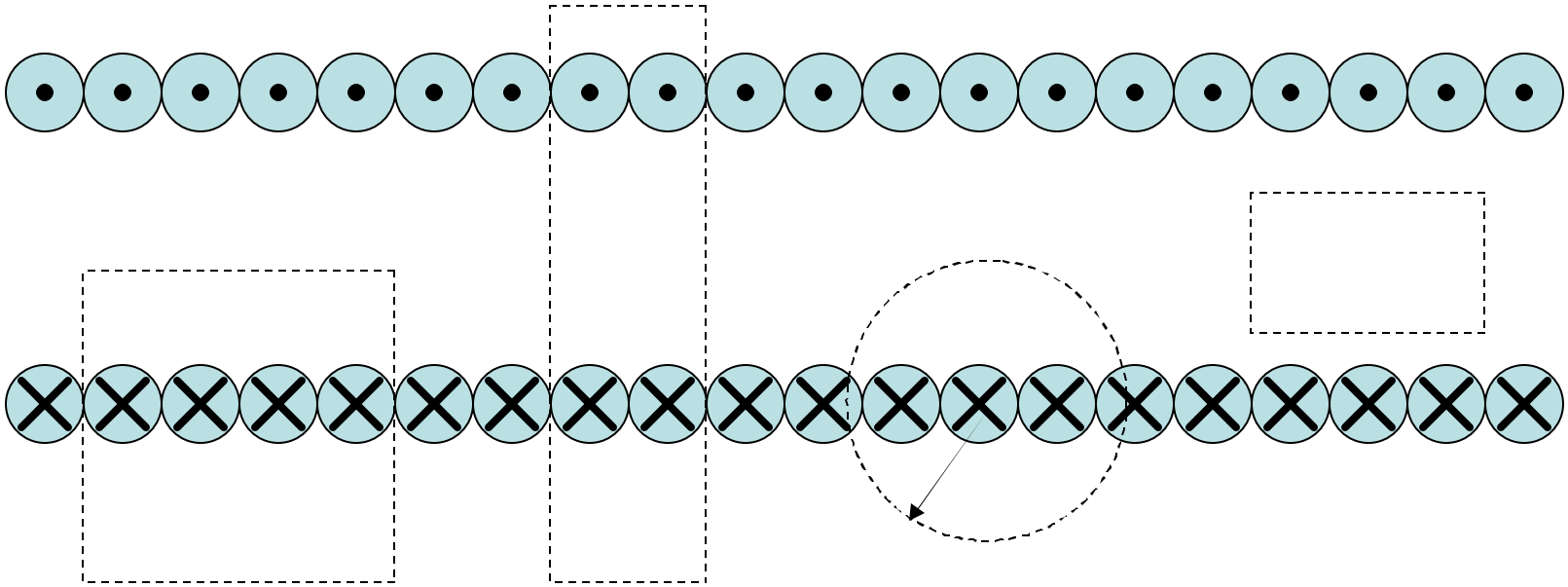
Which bar magnet has the most potential energy?



Each wire has current I_0 flowing out of page

What is the magnitude of the Force one wire exerts on the other?

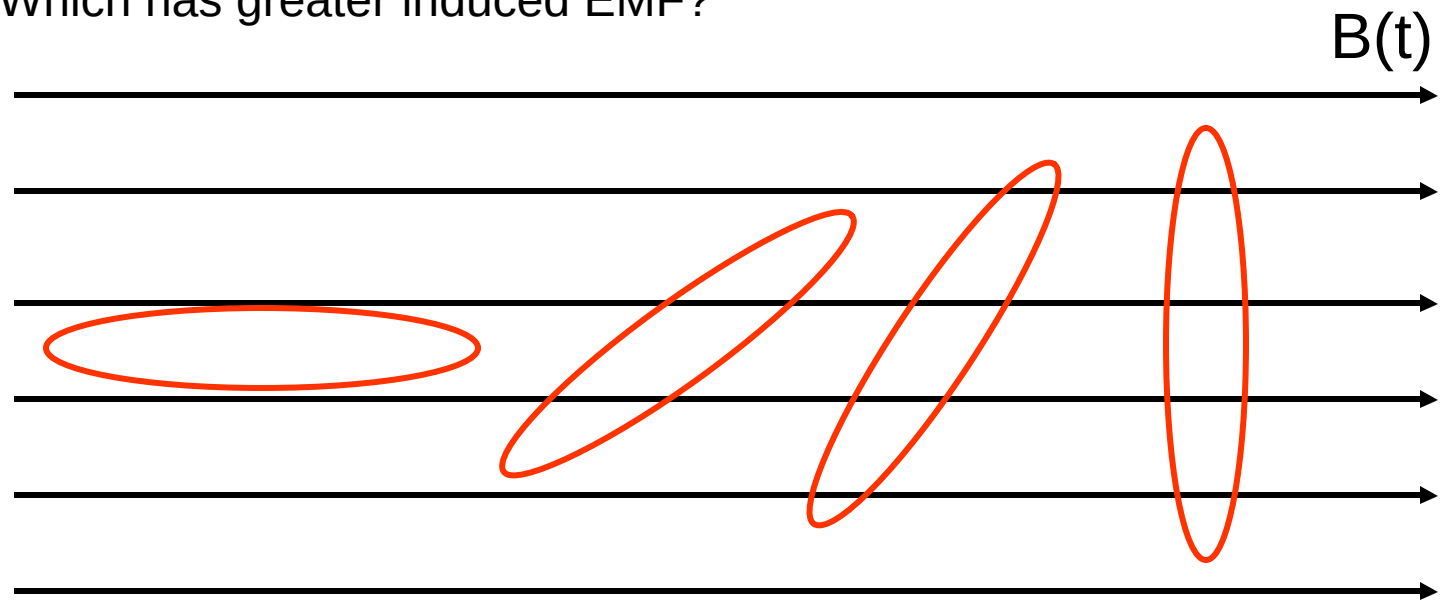
A) $\mu_0 I_0 I_0/(2\pi a)$
B) $\mu_0 I_0/(2\pi a)$
X) $\mu_0 I_0 I_0/(\pi a^2)$
Δ) $\mu_0 I_0/(\pi a^2)$



A) B) C) D)

Which is the best A’s loop to calculate the B field?

Which has greater induced EMF?



Parallel

A)

45 degrees

B)

60 degrees

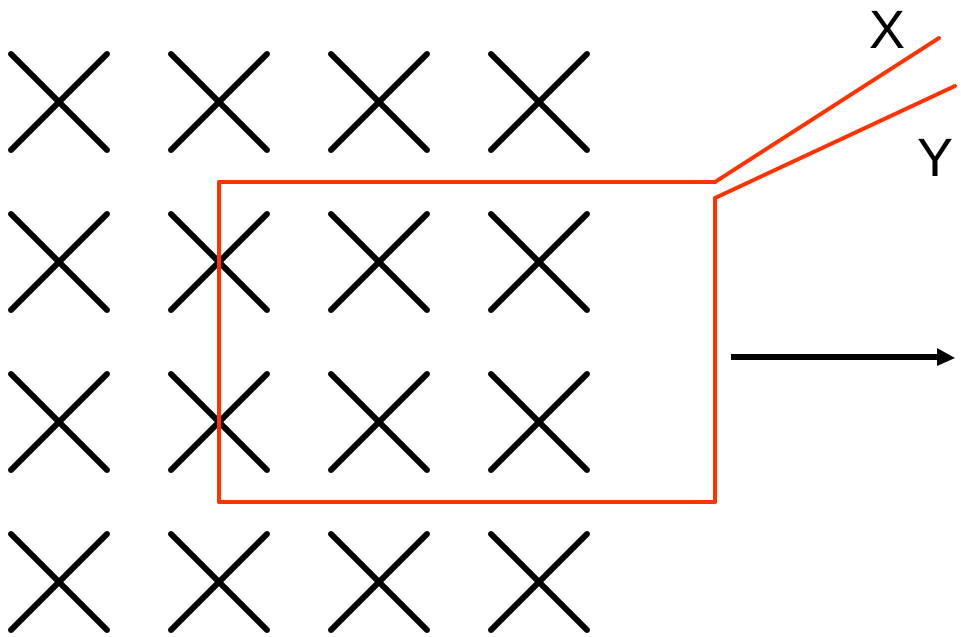
C)

90 degrees

D)

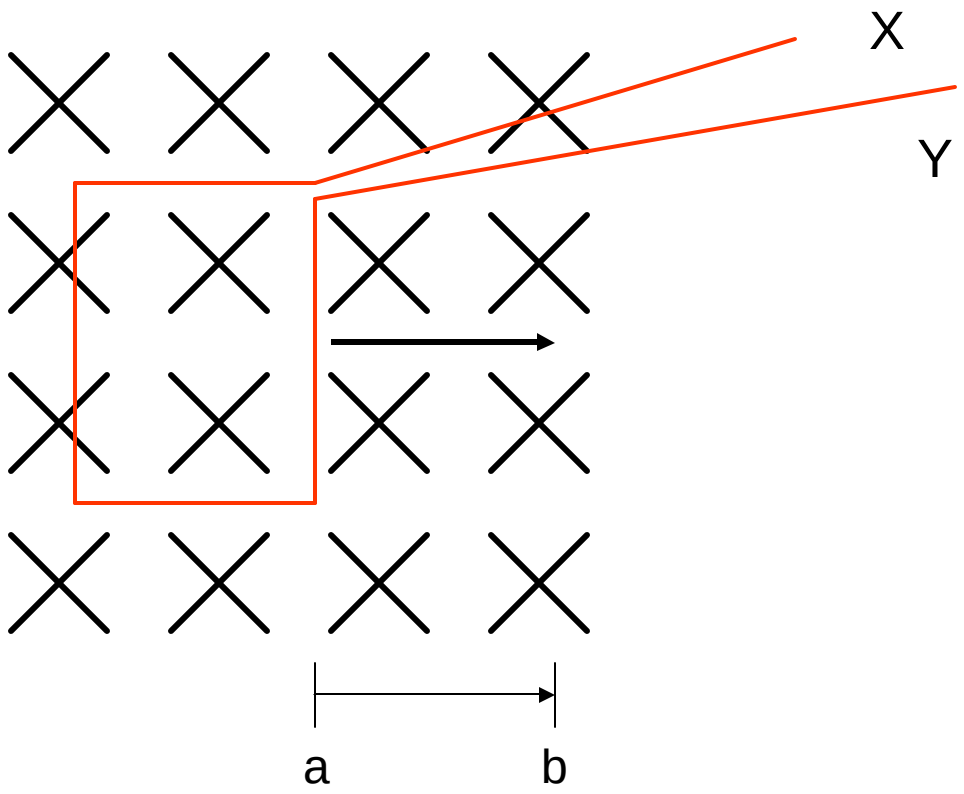
All the same

E)



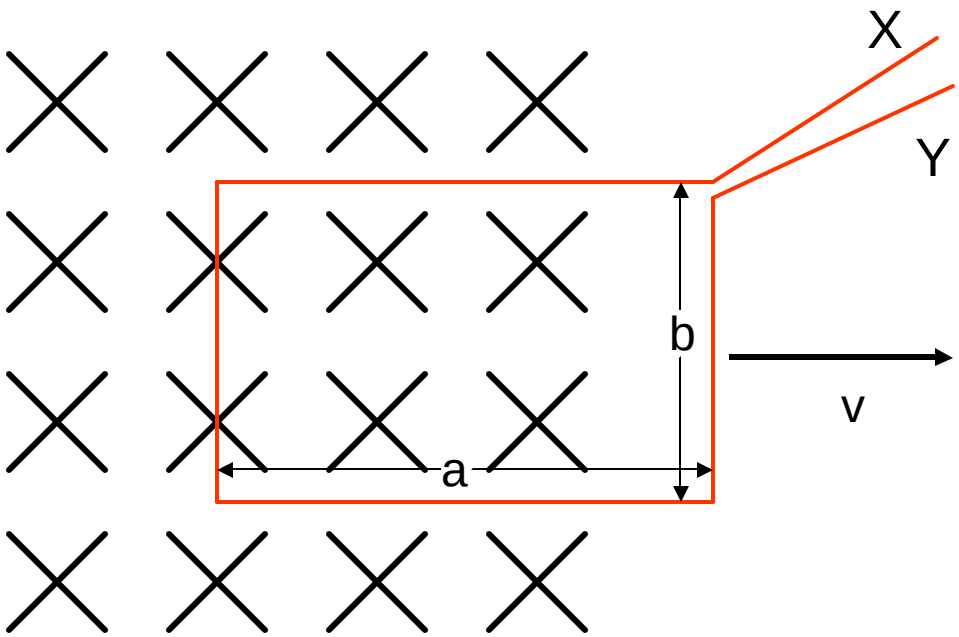
Wire loop is being pulled out of B field. Current flows

A) Out of wire X
B) Out of wire Y
C) No Current Will Flow
D) Either Direction



Wire loop's Right edge is pulled from a to b.

A) Current will flow out X
B) Current will flow out Y
C) No current will flow
D) Current could flow either direction



A wire loop of length *a* and height *b* is pulled out of a constant magnetic field at a constant velocity v. The change in magnetic flux per unit time is:

A) -avB
B) -bvB
C) -abB
D) -vB
E) $-a^2vB$