

Jan 19 21

**Get Clickers**

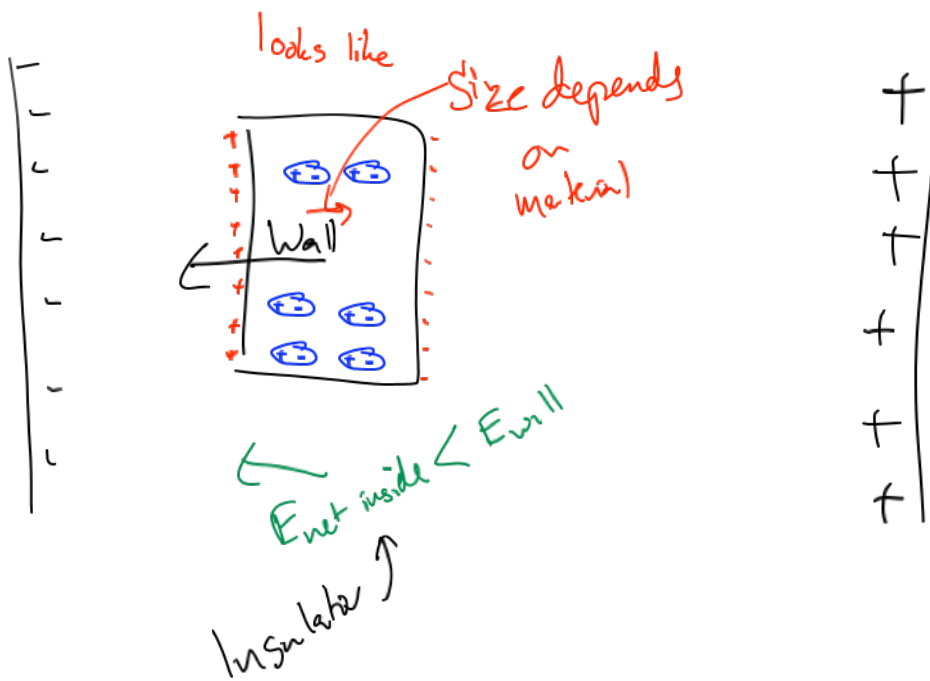
**Announcements**

First exam Next Wed.

Practice exam on website (under test info)

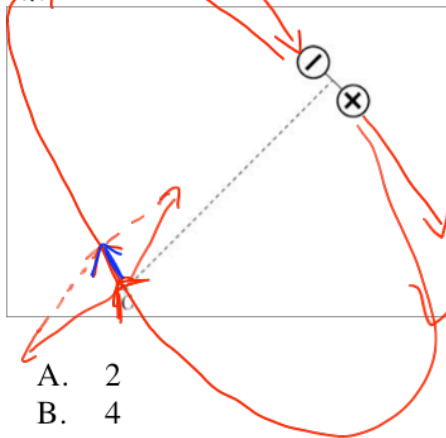
Review during Jana's study session

### Tangible: The Electric Table

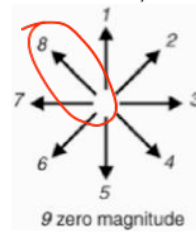


Clickers:

Q0


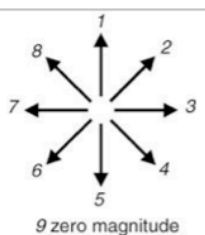


What is the direction of the electric field at location C, due to the dipole?




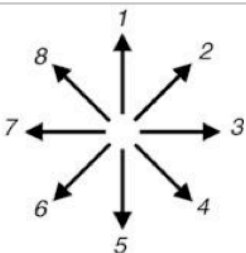
- A. 2
- B. 4
- C. 6
- D. 8
- E. 9

Q1

	<p>What is the direction of the electric <b>field</b> at the location of the point charge, due to the dipole?</p>	
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- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

Q2

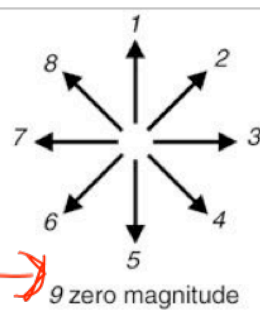
	<p>What is the direction of the electric <b>force</b> on the point charge, due to the dipole?</p>	 <p>9 zero magnitude</p>
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- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

$$\vec{F} = q\vec{E}$$

Q3

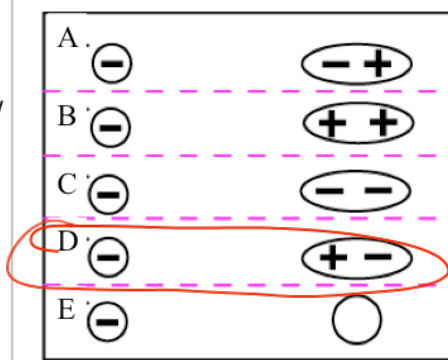
A positive point charge causes a neutral molecule to polarize, as shown below. What is the direction of the *electric force on the point charge*, due to the induced dipole?



- A. 1
- B. 3**
- C. 5
- D. 7
- E. 9

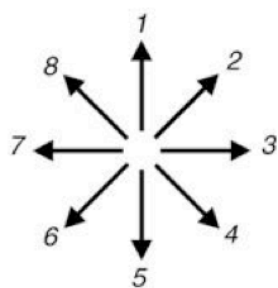
Q4

A negatively charged ion is located to the left of a neutral molecule. Which diagram correctly shows the polarization of the neutral molecule?



Q5

A negative point charge causes a neutral molecule to polarize, as shown below. What is the direction of the *electric force on the point charge*, due to the induced dipole?



9 zero magnitude

- A. 1
- B. 3**
- C. 5
- D. 7
- E. 9



Q6

A point charge is brought near a neutral molecule. (There is nothing else nearby).	A. Yes. The molecule can polarize so that it repels the point charge.
Is it possible for the point charge and the neutral molecule to repel each other?	B. No. The molecule can only polarize in a way that will attract the point charge.

Q7

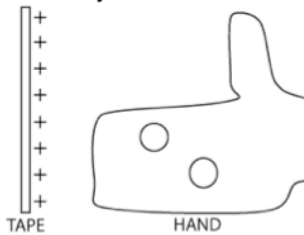
You observe that a tape is attracted to a negatively charged plastic pen.

What can you conclude?

- A. The tape is positively charged.
- B. The tape is negatively charged.
- C. The tape is neutral.
- D. The tape could be positive or neutral.
- E. The tape could be positive, negative, or neutral.

Q8

A positively charged tape is held near your hand.



Which diagram best shows the polarization of a molecule in your hand?

A

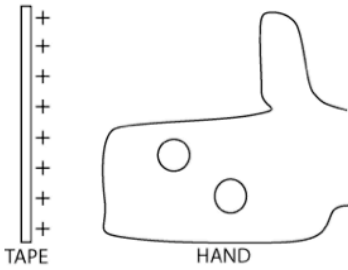
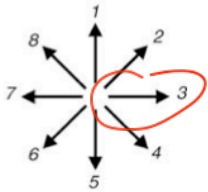
B

C

D

E

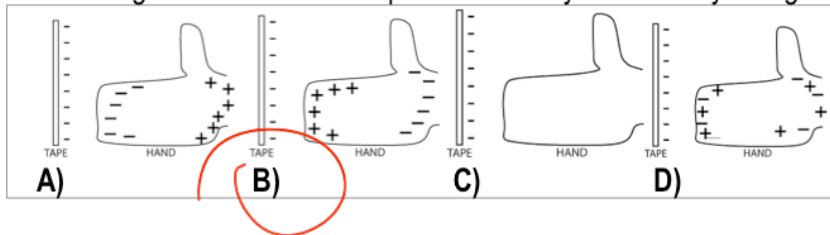
Q9

 <p>TAPE</p> <p>HAND</p>	<p>What is the direction of the force on the tape, due to the polarized molecules in your hand?</p>  <p>9 zero magnitude</p>
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- A. 1
- B. 3**
- C. 5
- D. 7
- E. 9

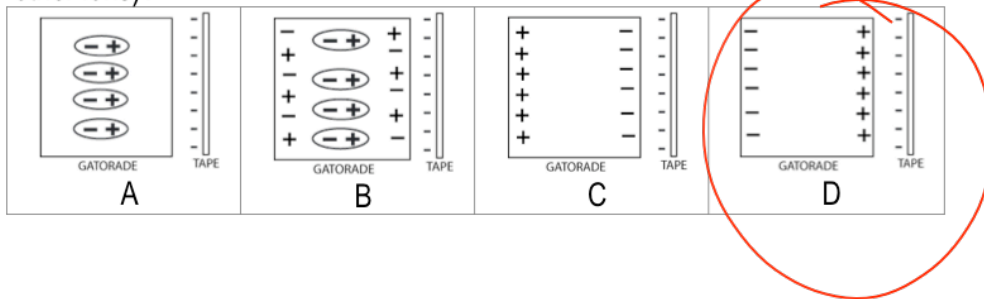
Q10

Which diagram best shows the polarization of your blood by a negative tape?



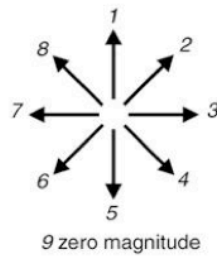
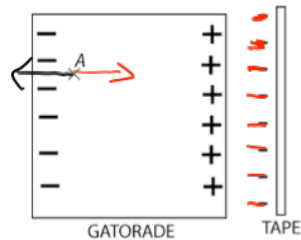
Q11

A glass of Gatorade is placed near a charged tape. Which diagram best shows the polarization of the Gatorade (which contains  $K^+$ ,  $Na^+$ ,  $Cl^-$ , and other ions)?



Q12

What is the direction of the net electric field at location A, inside the Gatorade?

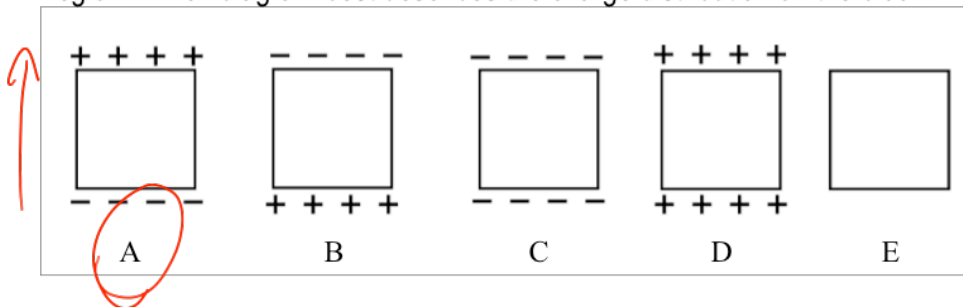


- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

$$\vec{E}_{net} = \vec{E}_{tape} + \vec{E}_{gatorade} = 0$$

Q13

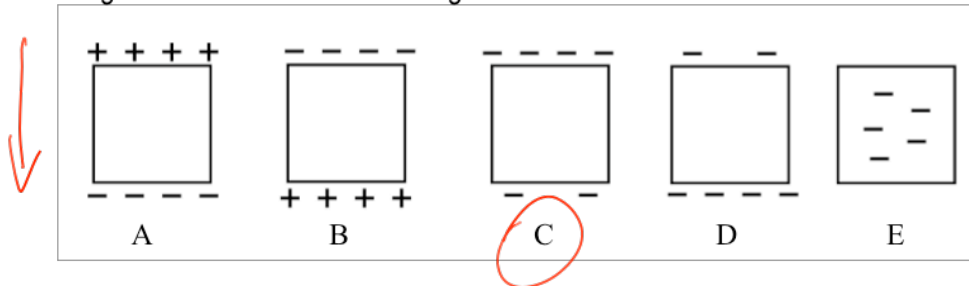
In a region of space there is an electric field upward (in the  $+y$  direction), due to charges not shown in the diagram. A neutral copper block is placed in the region. Which diagram best describes the charge distribution on the block?





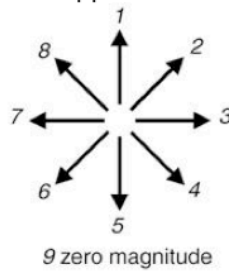
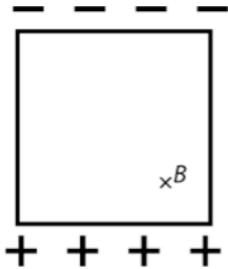
Q14

A **negatively charged** iron block is placed in a region where there is an electric field downward (in the  $-y$  direction) due to charges not shown. Which diagram best describes the charge distribution in and/or on the iron block?



Q15

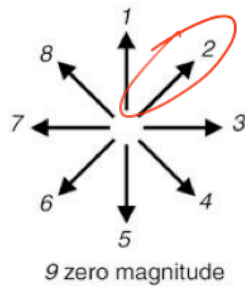
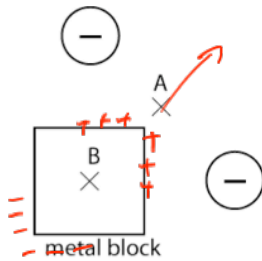
A neutral copper block is polarized as shown, due to an electric field made by external charges (not shown). What is the direction of the **net electric field at location  $B$** , which is inside the copper block?



- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

Q16

A neutral copper block is located near two balls which have equal negative charges, as shown in the diagram. What is the direction of the **net** electric field at location **A**? *Think carefully.*

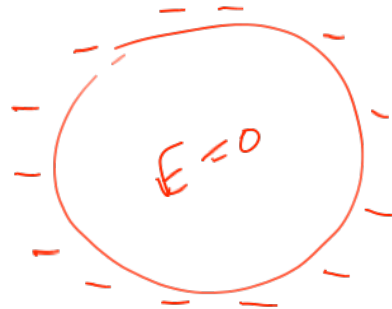
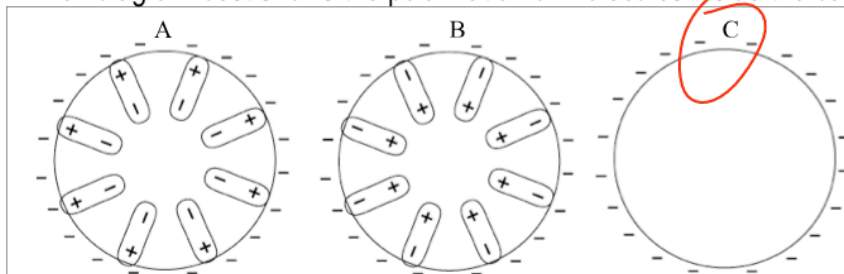


- A. 2
- B. 4
- C. 6
- D. 8
- E. 9

Q17

A solid plastic ball has negative charge uniformly spread over its surface. Remember that the electric field inside a uniformly charged sphere, due to the charges on the sphere, is zero.

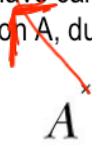
Which diagram best shows the polarization of molecules inside the ball?



Nothing  
polarizes  
since no  
 $E$   
inside

Q18

A proton is placed at location B.  
You have calculated the electric field at  
location A, due to the proton.



<sup>x</sup>  
*B*

To draw an arrow representing  
the electric field you calculated,  
what should you do?

- A) Put the tail at A
- B) Put the tail at B
- C) Put the tip at A
- D) Put the tip at B

Tail is at location where you  
calculate/measure the field

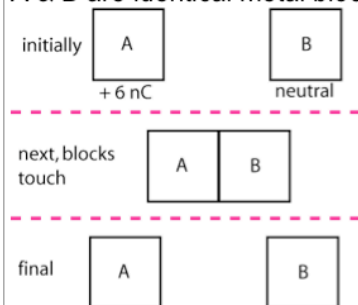
Q19

initially	<div>A</div> <div>+6 nC</div>	<div>B</div> <div>neutral</div>	<i>A &amp; B are identical metal blocks. What is the final charge of block B?</i>  A. +6 nC B. +3 nC C. 0 nC D. -3 nC E. -6 nC
next, blocks touch	<div>A</div> <div>B</div>		
final	<div>A</div>	<div>B</div>	

+3 nC    +3 nC

Q20

A & B are identical metal blocks.

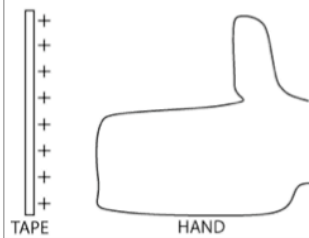


*What happens?*

- A. protons move from A to B
- B. positrons move from A to B
- C. electrons move from B to A
- D. both protons and electrons move
- E. no charges move

Q21

You neutralize a positively charged tape by running your finger across it.




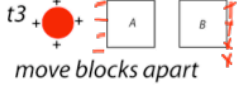


*What happens?*

- A. mobile electrons move from skin to tape
- B.  $\text{Cl}^-$  ions move from skin to tape
- C. protons move from tape to skin
- D. + ions move from tape to skin
- E. no charges move



Q22

Two aluminum blocks, A and B, are initially neutral. They have insulating handles, which are not shown. This sequence occurs:

<p><i>t1</i></p>  <p><i>neutral blocks touching</i></p>	<p><i>t3</i></p>  <p><i>move blocks apart</i></p>	<p>At a time after <i>t4</i>, what is the net charge of A?</p> <p>A) positive B) negative C) neutral</p>
<p><i>t2</i></p>  <p><i>positive charge near A</i></p>	<p><i>t4</i></p>  <p><i>take positive charge away</i></p>	

**Tangible: Making a U tape**

**Lab: Sticky tape**