

## P202 Practice Exam 1 Spring 2004 Instructor: Prof. Sinova

Name: \_\_\_\_\_ Date: \_\_\_\_\_

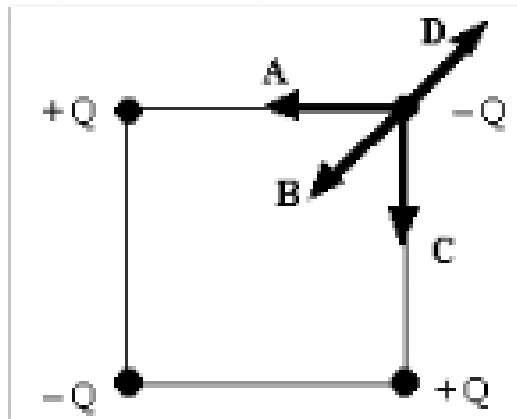
1. Each of three objects has a net charge. Objects **A** and **B** attract one another. Objects **B** and **C** also attract one another, but objects **A** and **C** repel one another. Which one of the following table entries is a possible combination of the signs of the net charges on these three objects?

	<b>A</b>	<b>B</b>	<b>C</b>
A)	+	+	-
B)	-	+	+
C)	+	-	-
D)	-	+	-
E)	-	-	+

2. Consider three identical metal spheres, **A**, **B**, and **C**. Sphere **A** carries a charge of  $-2.0 \mu\text{C}$ ; sphere **B** carries a charge of  $-6.0 \mu\text{C}$ ; and sphere **C** carries a charge of  $+5.0 \mu\text{C}$ . Spheres **A** and **B** are touched together and then separated. Spheres **B** and **C** are then touched and separated. Does sphere **C** end up with an excess or a deficiency of electrons and how many electrons is it?

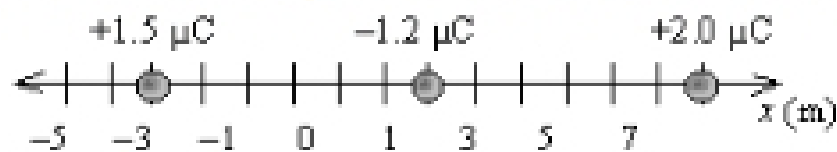
- A) deficiency,  $6 \times 10^{13}$   
B) excess,  $3 \times 10^{13}$   
C) excess,  $2 \times 10^{13}$   
D) deficiency,  $3 \times 10^{12}$   
E) deficiency,  $1 \times 10^{12}$

3. Four point charges, each of the same magnitude, with varying signs are arranged at the corners of a square as shown. Which of the arrows labeled **A**, **B**, **C**, and **D** gives the correct direction of the net force that acts on the charge at the upper right corner?



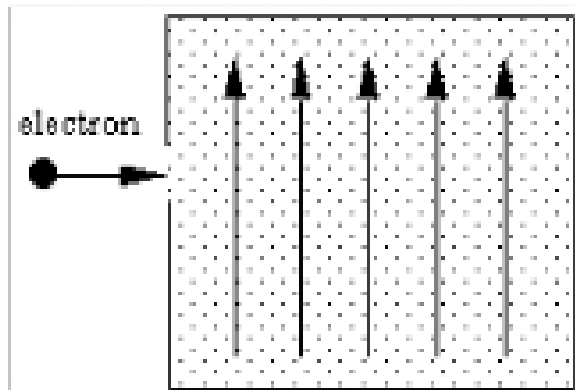
- A) **A**  
 B) **B**  
 C) **C**  
 D) **D**  
 E) The net force on that charge is zero.

4. Three charges are located along the  $x$  axis as shown in the drawing. The mass of the  $-1.2 \mu\text{C}$  charge is  $4.0 \times 10^{-9} \text{ kg}$ . Determine the magnitude and direction of the acceleration of the  $-1.2 \mu\text{C}$  charge when it is allowed to move if the other two charges remain fixed.



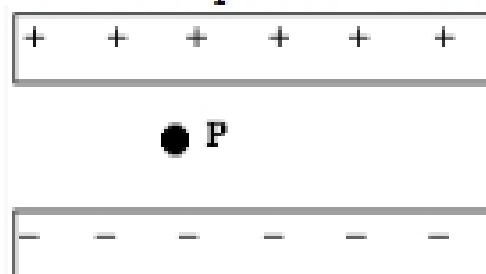
- A)  $2 \times 10^5 \text{ m/s}^2$ , to the right  
 B)  $1 \times 10^5 \text{ m/s}^2$ , to the left  
 C)  $7 \times 10^4 \text{ m/s}^2$ , to the right  
 D)  $3 \times 10^5 \text{ m/s}^2$ , to the left  
 E)  $4 \times 10^6 \text{ m/s}^2$ , to the right

5. An electron traveling horizontally enters a region where a uniform electric field is directed upward. What is the direction of the force exerted on the electron once it has entered the field?



- A) to the left  
 B) to the right  
 C) upward  
 D) downward  
 E) out of the page, toward the reader

The figure shows a parallel plate capacitor. The surface charge density on each plate is  $8.8 \times 10^{-8} \text{ C/m}^2$ . The point P is located  $1.0 \times 10^{-5} \text{ m}$  away from the positive plate.



6. Which one of the following statements concerning the direction of the electric field between the plates is true?
- A) It points to the left.  
 B) It points to the right.  
 C) It points toward the negative plate.  
 D) It points toward the positive plate.  
 E) It points up out of the plane of the page.
7. What is the magnitude of the electric field at the point P?
- A)  $8.8 \text{ N/C}$   
 B)  $88 \text{ N/C}$   
 C)  $1.0 \times 10^2 \text{ N/C}$   
 D)  $8.8 \times 10^2 \text{ N/C}$   
 E)  $9.9 \times 10^3 \text{ N/C}$