

# Physics 220B

## Recitations ~ Chapter 21 Part 1

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

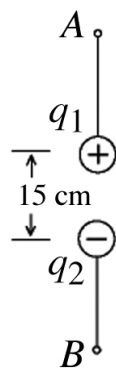
- 1) A piece of plastic has a net charge of  $+2.00 \mu\text{C}$ . How many more protons than electrons does this piece of plastic have? ( $e = 1.60 \times 10^{-19} \text{ C}$ ) 1) \_\_\_\_\_  
 A)  $1.25 \times 10^{19}$  B)  $2.50 \times 10^{19}$  C)  $1.25 \times 10^{13}$  D)  $2.50 \times 10^{13}$
- 2) A  $1.0\text{-C}$  point charge is  $15 \text{ m}$  from a second point charge, and the electric force on one of them due to the other is  $1.0 \text{ N}$ . What is the magnitude of the second charge? ( $k = 1/4\pi\epsilon_0 = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2$ ) 2) \_\_\_\_\_  
 A)  $0.025 \text{ C}$  B)  $25 \text{ C}$  C)  $1.0 \text{ C}$  D)  $25 \text{ nC}$  E)  $10 \text{ nC}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 3) Three point charges are placed on the  $x$ -axis. A charge of  $+2.0 \mu\text{C}$  is placed at the origin,  $-2.0 \mu\text{C}$  to the right at  $x = 50 \text{ cm}$ , and  $+4.0 \mu\text{C}$  at the  $100 \text{ cm}$  mark. What are the magnitude and direction of the electrostatic force that acts on the charge at the origin? ( $k = 1/4\pi\epsilon_0 = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2$ ) 3) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

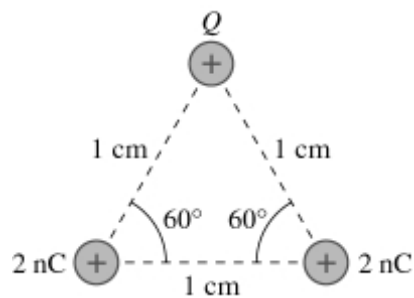
- 4) Two small insulating spheres are attached to silk threads and aligned vertically as shown in the figure. These spheres have equal masses of  $40 \text{ g}$ , and carry charges  $q_1$  and  $q_2$  of equal magnitude  $2.0 \mu\text{C}$  but opposite sign. The spheres are brought into the positions shown in the figure, with a vertical separation of  $15 \text{ cm}$  between them. Note that you cannot neglect gravity. ( $k = 1/4\pi\epsilon_0 = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2$ ) The tension in the lower thread is closest to 4) \_\_\_\_\_



- A)  $1.8 \text{ N}$ . B)  $1.2 \text{ N}$ . C)  $2.0 \text{ N}$ . D)  $1.6 \text{ N}$ . E)  $1.4 \text{ N}$ .

5) In the figure  $Q = 5.8 \text{ nC}$  and all other quantities are accurate to 2 significant figures. What is the magnitude of the force on the charge  $Q$ ? ( $k = 1/4\pi\epsilon_0 = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2$ )

5) \_\_\_\_\_



A)  $1.2 \times 10^{-3} \text{ N}$

B)  $9.0 \times 10^{-4} \text{ N}$

C)  $1.8 \times 10^{-3} \text{ N}$

D)  $1.0 \times 10^{-3} \text{ N}$

## Answer Key

Testname: CHAPTER 21

- 1) C
- 2) D
- 3) 0.072 N, toward the right
- 4) B
- 5) C