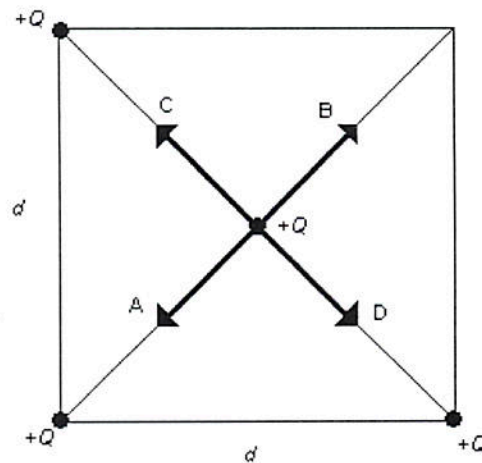


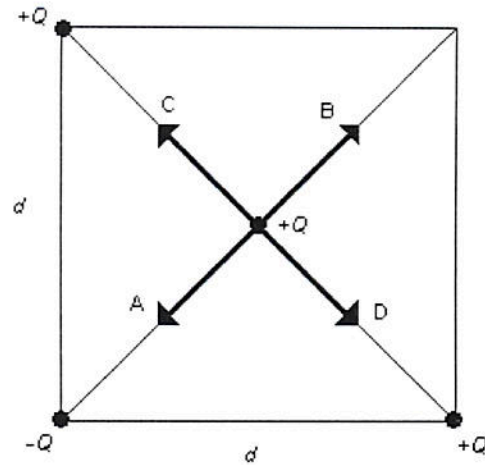
- 1) When atom A loses an electron to atom B, 1) \_\_\_\_\_
- 2) Two charges,  $Q_1$  and  $Q_2$ , are separated by a certain distance. The ratio of charge  $Q_1$  to charge  $Q_2$  is 1:2. The ratio of force on  $Q_1$  to the force on  $Q_2$  is 2) \_\_\_\_\_
- 3) When the distance between the two charges is doubled, the force between them is: 3) \_\_\_\_\_
- 4) Two charges,  $Q_1$  and  $Q_2$ , are separated by a certain distance  $R$ . If the magnitudes of the charges are doubled and their separation is also doubled, then what happens to the electrical force between these two charges? 4) \_\_\_\_\_
- 5) Two charges,  $Q_1$  and  $Q_2$ , are separated by a certain distance  $R$ . If the magnitudes of their charges are doubled and their separation is halved, then what happens to the electrical force between these charges? 5) \_\_\_\_\_

Figure 19-1



- 6) Three equal charges are at three of the corners of a square of side  $d$ . A fourth charge of equal magnitude is at the center of the square as shown in Figure 19-1. Which of the arrows shown represents the net force acting on the charge at the center of the square? 6) \_\_\_\_\_

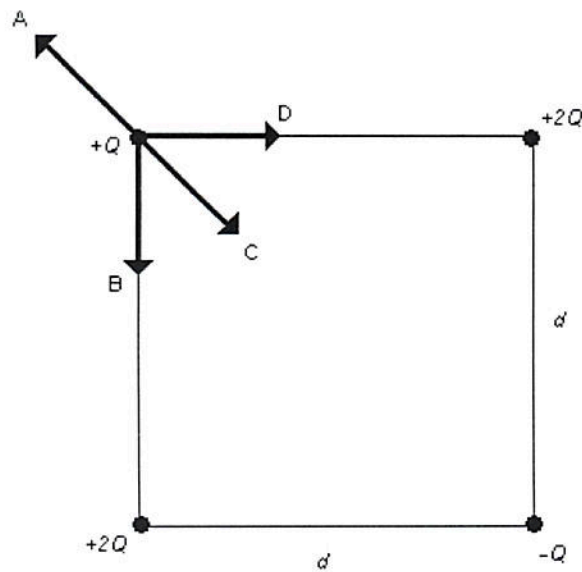
Figure 19-2



- 7) Four point charges of equal magnitudes but with varying signs are arranged on three of the corners and at the center of the square of side  $d$  as shown in Figure 19-2. Which of the arrows shown represents the net force acting on the center charge?

7) \_\_\_\_\_

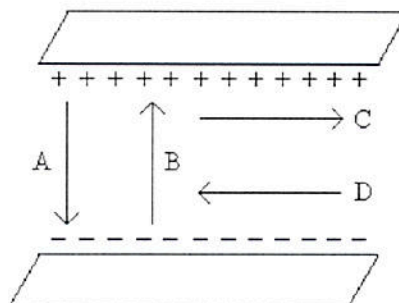
Figure 19-8



- 8) Four point charges of varying magnitude and sign are arranged on the corners of the square of side  $d$  as shown in Figure 19-8. Which of the arrows shown represents the net force acting on the point charge with a charge  $+Q$ ?

8) \_\_\_\_\_

Figure 19-14



- 9) Which of the arrows shown in Figure 19-14 represents the correct direction of the electric field between the two metal plates? 9) \_\_\_\_\_
- 10) 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? 10) \_\_\_\_\_
- 11) Two equal charges of magnitude  $+1 \text{ C}$  are separated by a distance of  $1 \text{ km}$ . What is the force acting between these two charges? 11) \_\_\_\_\_
- 12) The force of attraction between a  $-40.0 \mu\text{C}$  and  $+108 \mu\text{C}$  charge is  $4.00 \text{ N}$ . What is the separation between these two charges? 12) \_\_\_\_\_
- 13) Two point charges, initially  $2.0 \text{ cm}$  apart, experience a  $1.0\text{-N}$  force. If they are moved to a new separation of  $8.0 \text{ cm}$ , what is the electric force between them? 13) \_\_\_\_\_
- 14) 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 which acts on the charge at the origin? 14) \_\_\_\_\_
- 15)  $Q_1 = 6.0 \text{ nC}$  is at  $(0.30 \text{ m}, 0)$ ;  $Q_2 = -1.0 \text{ nC}$  is at  $(0, 0.10 \text{ m})$ ;  $Q_3 = 5.0 \text{ nC}$  is at  $(0, 0)$ . What is the direction of the net force on the  $5.0 \text{ nC}$  charge? 15) \_\_\_\_\_
- 16)  $Q_1 = 6.0 \text{ nC}$  is at  $(0.30 \text{ m}, 0)$ ;  $Q_2 = -1.0 \text{ nC}$  is at  $(0, 0.10 \text{ m})$ ;  $Q_3 = 5.0 \text{ nC}$  is at  $(0, 0)$ . What is the magnitude of the net force on the  $5.0 \text{ nC}$  charge? 16) \_\_\_\_\_
- 17) Two point charges of magnitude  $+7.00 \mu\text{C}$  and  $-9.00 \mu\text{C}$  are placed along the  $x$ -axis at  $x = 0 \text{ cm}$  and  $x = 40.0 \text{ cm}$ , respectively. Where must a third charge,  $q$ , be placed along the  $x$ -axis so that it does not experience any net force because of the other two charges? 17) \_\_\_\_\_
- 18) What are the magnitude and direction of the electric field at a distance of  $1.50 \text{ m}$  from a  $50.0\text{-nC}$  charge? 18) \_\_\_\_\_
- 19) Two point charges of  $+20.0 \mu\text{C}$  and  $-8.00 \mu\text{C}$  are separated by a distance of  $20.0 \text{ cm}$ . What is the intensity of electric field  $E$  midway between these two charges? 19) \_\_\_\_\_
- 20) A particle with a charge of  $4.0 \mu\text{C}$  has a mass of  $5.0 \times 10^{-3} \text{ kg}$ . What electric field directed upward will exactly balance the weight of the particle? 20) \_\_\_\_\_

21) A styrofoam ball of mass 0.120 g is placed in an electric field of 6000 N/C pointing downward.  
What charge must be placed on the ball for it to be suspended?

21) \_\_\_\_\_

## Answer Key

Testname: UNTITLED1

- 1) atom A becomes a positive ion and atom B becomes a negative ion.
- 2) 1:1.
- 3) reduced by a factor of 4.
- 4) It remains the same.
- 5) It increases by a factor of 16.
- 6) B
- 7) A
- 8) A
- 9) A
- 10)  $1.25 \times 10^{13}$
- 11) 9000 N
- 12) 3.12 m
- 13) 1/16 N
- 14) 0.072 N right
- 15)  $56^\circ$  above -x axis
- 16)  $5.4 \times 10^{-6}$  N
- 17) -2.99 m
- 18) 200 N/C away from the charge
- 19)  $25.2 \times 10^6$  N/C directed towards the negative charge
- 20)  $1.2 \times 10^4$  N/C
- 21) -196 nC