

Name \_\_\_\_\_  
**Electrostatics**

**Multiple Choice**

- \_\_\_\_\_ 1. Which of the following statements is true about electric forces?  
a. Electric forces cause objects to only attract each other.  
b. Electric forces cause objects to only repel each other.  
c. Electric forces cause objects to repel or attract each other.  
d. Electric forces have no effect on each other.
- \_\_\_\_\_ 2. Which of the following materials is the best conductor of electricity?  
a. Wet skin                      b. Glass                      c. Dry air                      d. Rubber
- \_\_\_\_\_ 3. When two bodies are charged, the total charge before and after charging remains the same because of:  
a. quantization of charges                      c. law of induction  
b. conservation of charges                      d. Coulomb's law
- \_\_\_\_\_ 4. The distance between two charges  $q_a$  and  $q_b$  is  $r$ , and the force between them is  $F$ . What is the force between them if the distance between them is doubled?  
a.  $F/4$                       b.  $4F$                       c.  $9F$                       d.  $F/9$
- \_\_\_\_\_ 5. Charging by \_\_\_\_\_ charges a neutral body by touching it with a charged body; whereas charging by \_\_\_\_\_ charges an object without touching it with a charged body.  
a. conduction, induction                      c. force, conduction  
b. induction, conduction                      d. force, induction
- \_\_\_\_\_ 6. Electric forces can be either repulsive or attractive, whereas gravitational force is always:  
a. attractive                      b. repulsive                      c. both a and b                      d. neither a nor b
- \_\_\_\_\_ 7. \_\_\_\_\_ charges repel, whereas \_\_\_\_\_ charges attract.  
a. Like, opposite                      c. Positive, negative  
b. Opposite, like                      d. Negative, positive
- \_\_\_\_\_ 8. A/An \_\_\_\_\_ is a material in which charges will not move easily, whereas a/an \_\_\_\_\_ is a material that allows charges to move about easily.  
a. conductor, insulator                      c. electroscope, conductor  
b. insulator, conductor                      d. insulator, electroscope
- \_\_\_\_\_ 9. \_\_\_\_\_ forces between charges are enormous in comparison to \_\_\_\_\_ forces.  
a. Electrical, gravitational                      c. Positive, negative  
b. Gravitational, electrical                      d. Negative, positive
- \_\_\_\_\_ 10. \_\_\_\_\_ can act from great distances.  
a. Electric force                      c. Neither a nor b  
b. Gravitational force                      d. Both a and b
- \_\_\_\_\_ 11. A/An \_\_\_\_\_ is the field that exists around any charged object.  
a. electric field line                      c. gravitational force  
b. electric potential difference                      d. electric field
- \_\_\_\_\_ 12. Electric field lines are directed \_\_\_\_\_ positive charges and \_\_\_\_\_ negative charges.  
a. away from, toward                      c. parallel to, perpendicular to

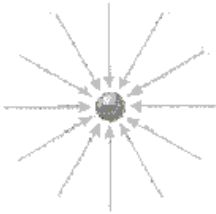
b. toward, away from

d. perpendicular to, parallel to

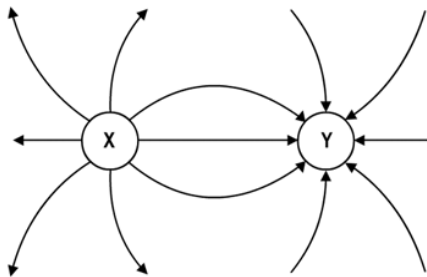
- \_\_\_ 13. A/An \_\_\_ is a field that exists around a charged object, whereas \_\_\_ provide a model that indicate the field's strength.
- a. electric field, electric field lines      c. conductor, electric field lines  
b. capacitor, electric field lines      d. insulator, electric field lines
- \_\_\_ 14. The direction of the force on a positive test charge near another positive charge is \_\_\_ the other charge.
- a. away from      b. toward      c. parallel to      d. perpendicular
- \_\_\_ 15. Which of the following elements is NOT magnetized temporarily in the presence of a permanent magnet?
- a. iron      b. cobalt      c. nickel      d. carbon

### Short Answer

16. Is the charge shown in the figure above positive or negative?



17. Electric field lines around two charges are shown in the diagram. Identify the type of charges on the objects X and Y. (3 points)



### Problem

18. A 1.3 nC test charge experiences a force of  $4.5 \times 10^6$  N when placed 12 cm from a source charge.
- (a) What is the strength of this electric field?  
(b) What is the magnitude of the source charge?
19. Two electrostatic point charges of  $4.5 \times 10^{-6}$  C and  $5.5 \times 10^{-6}$  C exert repulsive forces on each other of 45 N. What is the distance between the two?