

KEY Physics

Static Electricity Test

Name: _____

Per. _____ Date: _____

HINT: $k = 9.00 \times 10^9 \text{ N m}^2 / \text{C}^2$

NOTE: Use the scan-tron form for Q. 1 - 12

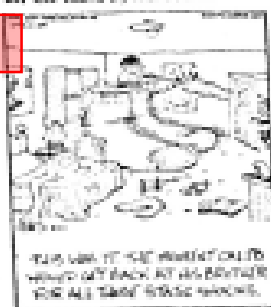


1. Originally a comb was neutral, but then it was rubbed with plastic wrap and became positively charged.

During this process the comb:

- a) lost electrons
- b) gained electrons
- c) lost protons
- d) gained protons

off the walls by Mark Perini



2. The plastic wrap was originally neutral, but must have:

- a) become neg. charged
- b) become pos. charged
- c) remained neutral

3. Which pair(s) of charges will attract?

i)  

ii)  

iii)  

iv)  

- a) i only
- b) ii only
- c) i and iii
- d) ii and iv

4. A neutral foil bit is *touched* by a negatively charged rod.

What happens to the foil bit?

- a) the foil bit becomes negative
- b) the foil bit becomes positive
- c) the foil bit stays neutral

5. THIS happens because:

- a) the foil bit gains negatives from the rod
- b) the foil bit gives negatives to the rod
- c) the foil bit gains positives from the rod
- d) the foil bit gains neutrons from the rod

6. A neutral foil bit is instead touched by a positively charged rod.
What happens to the foil bit?
- a) the foil bit becomes negative
 - b) the foil bit becomes positive
 - c) the foil bit stays neutral
7. THIS happens because:
- a) the foil bit gives neutrons to the rod
 - b) the foil bit gives electrons to the rod
 - c) the foil bit gains electrons from the rod
 - d) the foil bit gives protons to the rod
8. Which reason below is the real reason you are safe in a car during a lightning storm?
- a) glass is an insulator and cars have a lot of glass.
 - b) lightning won't hit a car because a car is insulated from the ground with its rubber tires.
 - c) you are only safe when your car is moving, because when you are moving you can avoid the lightning strike altogether.
 - d) cars have a metal shell, and charge would spread around the outside of the shell, but not enter the car.
9. A glass rod is rubbed on a silk cloth and the silk cloth becomes negatively charged. The glass rod:
- a) becomes neg. charged also
 - b) becomes pos. charged
 - c) remains neutral
10. A negatively charged rod is brought very close to a neutral object without touching. What happens?
- a) there is no interaction
 - b) they repel
 - c) they attract
11. Which of the following explanations is most accurate about lightning rods.
- a) Lightning rods are designed to be struck by lightning so your house will remain safe.
 - b) Lightning rods have a pointy end, which allows them to discharge the air, before lightning strikes.
 - c) Lightning rods made out of an insulator, which doesn't allow charges to flow.
12. To make a *positive* ion out of an atom,
- a) one or more p^+ 's are added
 - b) one or more p^+ 's are removed
 - c) one or more e^- 's are added
 - d) one or more e^- 's are removed

13. When people put their hand on top of the Van de Graaff generator their hair often stands straight out from their head.

Why would the strands of people's hair stand straight up/out?

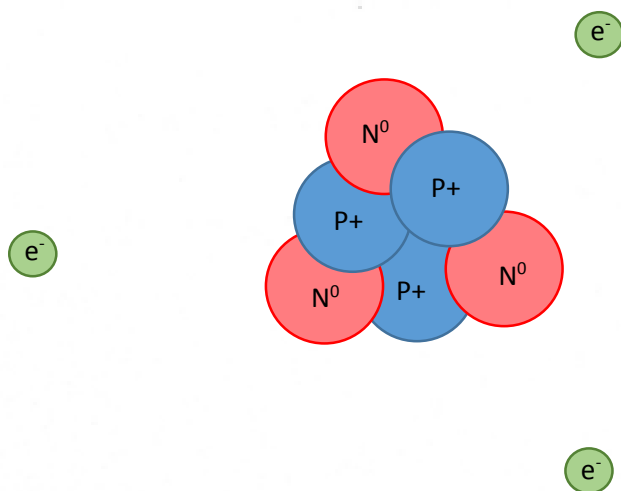
Van de Graaff generator has a positive charge, electrons in person are attracted to that charge and congregate on person's hands. This leaves the hair positively charged. Since like charged repel, all the positive strands repel each other, and move away from each other so they stand up

14. A positively charged object is grounded by touching it.
Explain what happens during the process of grounding it.
(what charges flow - from where - to where?)

Electrons flow from the ground wire into the can to make it neutral again

Once the object has been "grounded" it is now (circle one):
negatively charged *positively charged* **neutral** *polarized*

15. Draw an atom that has exactly 3 protons in it. (Also, $3n^0 + 3e^-$)
You must label the protons: p^+
label the neutrons: n^0
label the electrons: e^-
& draw an arrow to point out the nucleus



16. Two charged objects are repelling each other with a certain force. What is ONE way that you could make that force of repulsion less?

Separate them more

OR

Reduce the charges

17. A POSITIVELY charged rod is brought near a soda can that is lying on a wooden table top. The rod is brought close, but does NOT touch the can.

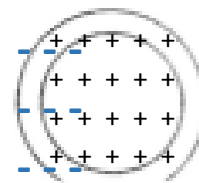
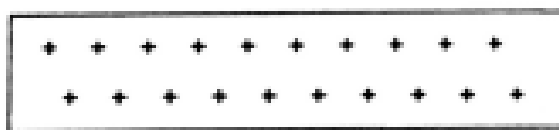
a) ~~The can will be~~ (circle one):

ATTRACTED

REPELLED

NO NET FORCE

b) Draw the locations of positive and negative charges on the can.



(side view of can)

(wooden table top)

c) Overall the can is (circle one):

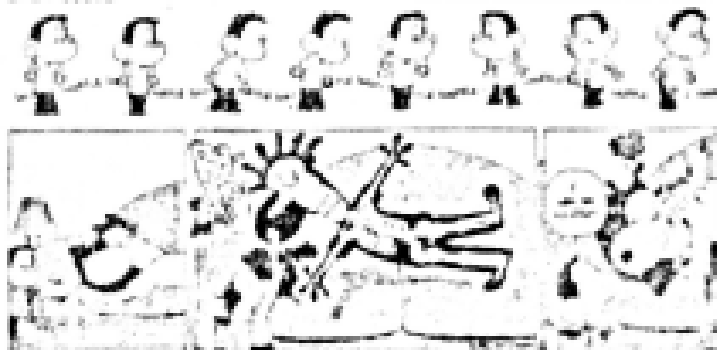
i) POLARIZED

ii) CHARGED negatively

iii) CHARGED positively

BART BLUES

BY BOB KIRKMAN & JERRY SCOTT



18. Two negative charges are placed 5.0 cm apart.

a) Do they ATTRACT or REPEL

b) If the charges are moved further away from each other, so now they are 15.0 cm apart....

What happens to the force? it INCREASES it DECREASES

it REMAINS the SAME

c) Since the distance is 3x what it was before, show the work to determine what happens to the force between the charges.

$$\frac{F_{\text{elec}}}{9} = \frac{k q_1 q_2}{(3d)^2}$$

19. Two thunder clouds are approaching a city. If one has a charge of -2.8 Coulombs and the other one has a charge of -1.9 Coulombs and the force between them is 2,400 N, find out the distance between them (their centers).

S D B W S

$$2400N = \frac{k * (-2.8C) * (-1.9C)}{d^2}$$

$$2400N = \frac{47826800000}{d^2}$$

$$2400N = \frac{(8.99 \times 10^9) * (-2.8C) * (-1.9C)}{d^2}$$

$$d = 4464m$$

$$2400N = \frac{(8.99 \times 10^9 * (-2.8C) * (-1.9C))}{d^2}$$

Physicists With Charge By Hilary Price

