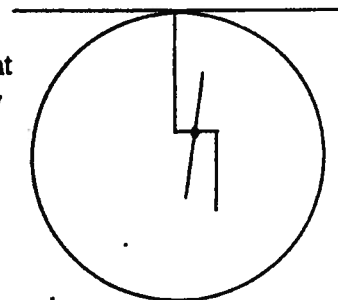
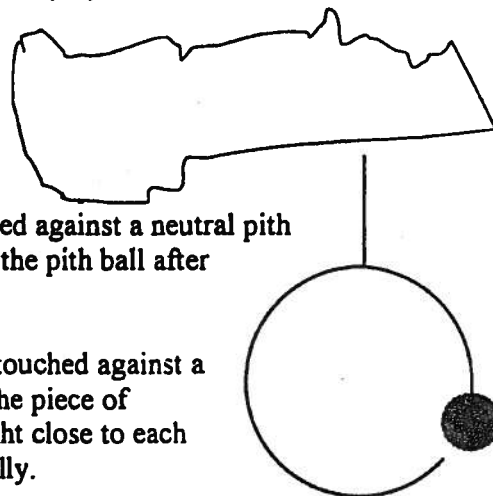


SNC 1D0 - Methods of Charging Worksheet

1. A piece of cat's fur is rubbed with a piece of acetate. The fur is then brought near the top of a metal wand electroscope and the electroscope is charged permanently by induction. What charge does the electroscope have? Explain your answer.
2. A piece of aluminum is rubbed against a piece of ebonite. What charge does each substance have after the rubbing? Explain your answer.
3. A piece of paraffin wax is rubbed with rubber. The piece of rubber is touched against a neutral pith ball. What charge does the pith ball have ?
4. A piece of aluminum and a piece of cotton are rubbed together. The piece of cotton is brought very close to the top of a metal wand electroscope and the electroscope is charged permanently by induction. What charge does the electroscope have? Explain your answer.
5. A piece of wool is rubbed against a glass rod. Add positives and negatives to the diagram at the right to represent the wool after rubbing. Use 8 positive charges in your diagram.
6. A piece of polyethylene is rubbed with sulfur. The polyethylene is touched against a neutral pith ball. Add positives and negatives to the diagram at the right to represent the pith ball after touching. Use 6 positive charges in your diagram.
7. A piece of calcium is rubbed with some silk and the piece of calcium is touched against a neutral pith ball. A piece of paraffin wax is rubbed with aluminum and the piece of paraffin touched to a second pith ball. When the two pith balls are brought close to each other, what type of behaviour would they show? Explain your answer fully.
8. A negatively charged rod is brought near the top of a metal wand electroscope and the electroscope is charged permanently by induction. Then a piece of silk and a piece of carbon are rubbed together. When the rubbed carbon is brought near the ~~wand~~ of the electroscope, what type of behaviour would they show? Explain your answer fully.
9. A piece of platinum and a piece of copper are rubbed together. The platinum is brought near the top of a metal wand electroscope and the electroscope is charged permanently by induction. Add positives and negatives to the diagram at the right to represent the electroscope after charging. Use 8 positive charges in your diagram.
10. After a piece of cotton and a piece of rubber are rubbed together, the cotton is touched against a neutral pith ball. Next, in a separate experiment, silk and ebonite are rubbed together. The rubbed piece of silk is brought near the top of a metal wand electroscope and the electroscope is charged permanently by induction. When the pith ball is brought near the ~~wand~~ of the electroscope, what type of behaviour would it show? Explain your answer fully.
11. After a piece of fur and a piece of acetate are rubbed together, the fur is touched against a neutral pith ball. Next, in a separate experiment, nickel and sulfur are rubbed together. The rubbed piece of nickel is brought near the top of a metal wand electroscope and the electroscope is charged permanently by induction. When the pith ball is brought near the ~~wand~~ of the electroscope, what type of behaviour would it show? Explain your answer fully.



(Weak hold of electrons)

Acetate
Glass
Nylon
Wool
Cat fur, human hair
Calcium, magnesium, lead
Silk
Aluminum, zinc
Paper
Polyurethane
Cotton
Steel
Wood
Sulphur
Paraffin wax
Hard Rubber / Ebonite
Epoxy Glass
Plastic
Carbon, copper, nickel
Stainless Steel
Synthetic Rubber
Acrylic
Celluloid
Polyethylene
Sulphur
Teflon
Silicone Rubber
Platinum, gold
(Strong hold on electrons)

(Weak hold of electrons)

Acetate
Glass
Nylon
Wool
Cat fur, human hair
Calcium, magnesium, lead
Silk
Aluminum, zinc
Paper
Polyurethane
Cotton
Steel
Wood
Sulphur
Paraffin wax
Hard Rubber / Ebonite
Epoxy Glass
Plastic
Carbon, copper, nickel
Stainless Steel
Synthetic Rubber
Acrylic
Celluloid
Polyethylene
Sulphur
Teflon
Silicone Rubber
Platinum, gold
(Strong hold on electrons)

①

Methods of Charging Worksheet

- 1) Acetate has a weaker hold on electrons than cat fur, so acetate becomes positive and the fur becomes negative.

Charging permanently by induction gives the charged object the opposite electrical charge to the object inducing the charge.

∴ The electroscope will have the opposite charge of the negative cat fur.
The electroscope will be positive.

- 2) Aluminum has a weaker hold on electrons than ebonite.

∴ Aluminum is positive & Ebonite is negative.

- 3) Paraffin wax has a weaker hold on electrons than rubber.

∴ Paraffin wax becomes positive & the rubber becomes negative.

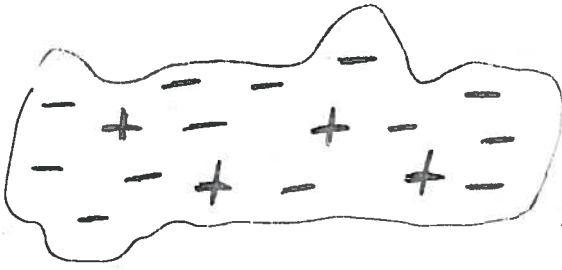
- 4) Aluminum has a weaker hold on electrons than cotton. Aluminum will be positive & cotton negative.

Permanently charging by induction with negative cotton will give the electroscope the opposite charge. It will be positive.

2

Wool → Strong hold

glass → Weak hold



very negative

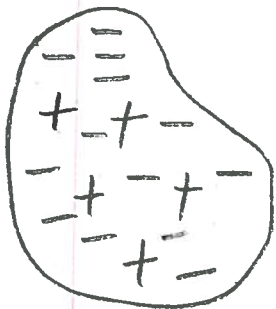


very positive

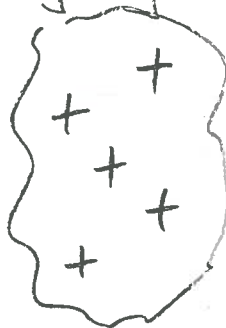
6) Polyethylene has a slightly weaker hold of electrons than sulfur, so polyethylene will be positive & sulfur will be negative.

Touching the polyethylene to the pith ball by contact the pith ball positive

Sulfur



Polyethylene



Pith ball



(3)

7) Silk → negative

Calcium → positive

Touched pith ball

→ positive by contact

Aluminium → positive

Paraffin wax → negative

Touched pith ball

→ negative by contact

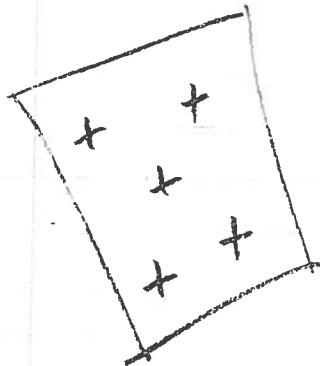
The pith balls will have opposite charges,
∴ they should attract.

8) Negative rod would give the opposite charge by permanent induction, so the electroscope would be positive

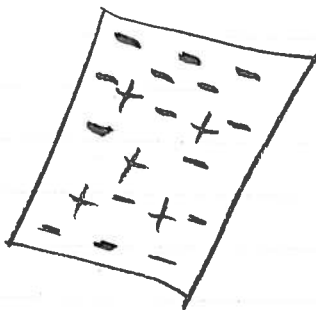
Silk would be positive & carbon will be negative.

So, if negative carbon is brought near the positive electroscope, they should attract.

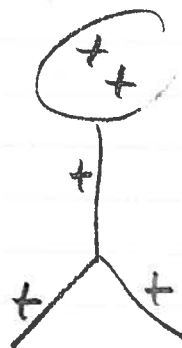
9) Copper
Positive



Platinum
Negative



→ Electroscope
Opposite / Positive



4

10) rubber \rightarrow negative

cotton \rightarrow positive

Pith ball \rightarrow positive by contact

ebonite \rightarrow negative

silk \rightarrow positive

Electroscope \rightarrow negative by permanent induction

The pith ball & electroscope should be oppositely charged, and should attract.

11) Acetate \rightarrow positive

Fur \rightarrow negative

Pith ball \rightarrow negative by contact

Sulfur \rightarrow negative

Nickel \rightarrow positive

Electroscope \rightarrow negative by induction

The pith ball & electroscope should be each negatively charged, and should repel.