

First Name: _____

Last Name: _____

101 - Worksheet - Electrical Interactions and Electroscopes

Textbook Questions

None

Diploma Worksheet Questions - Definitions and Electronegativity

Q53: The statement that the net amount of charge in a closed system is constant is an expression of the law of conservation of

- a. Charge *↳ Physics Principle # 7*
- b. Energy
- c. Mass-energy
- d. Electrostatic forces

Q54: The coulomb is defined as one

- a. Ampere-second
- b. Volt per second
- c. Electronic charge
- d. Ampere per second

$$I = \frac{q}{t}$$

so $q = It$ *↳ variables*
 $C = As$ *↳ units*

Q55: Two objects can become charged when rubbed together because

- a. Like charges repel and unlike charges attract
- b. Negative charges redistribute but positive charges remain fixed
- c. Both positive and negative charges redistribute when the objects touch
- d. Positive charges move from one object to another when the objects touch

Positive charges (protons) never move. Ever.

Electricity is the movement of electrons.

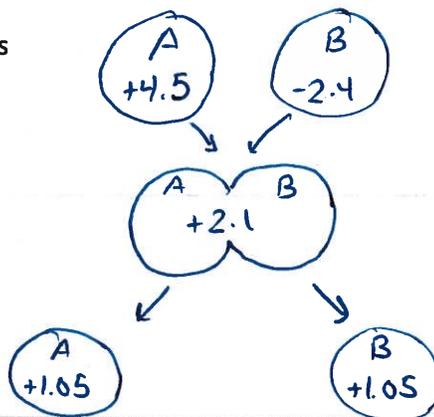
Diploma Worksheet Questions – Conduction and Conservation of Charge

Use the following information to answer Q61:

Two conducting spheres have identical surface areas. Sphere **A** has a charge of $4.50 \mu\text{C}$. Sphere **B** has a charge of $-2.40 \mu\text{C}$. Spheres **A** and **B** are brought into momentary contact and separated to a distance of 2.50 cm .

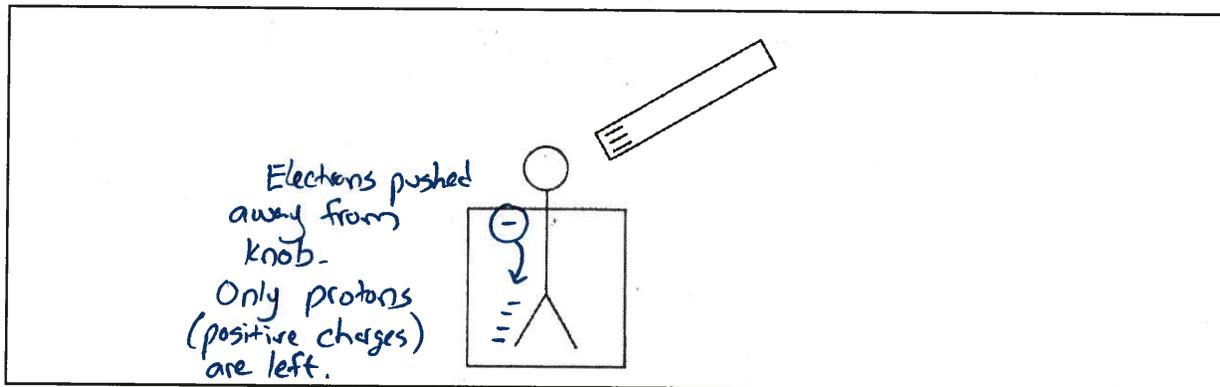
Q61: After contact, the charge on sphere **A** is

- a. $1.05 \mu\text{C}$
- b. $2.10 \mu\text{C}$
- c. $3.45 \mu\text{C}$
- d. $6.90 \mu\text{C}$



Diploma Worksheet Questions – Induction and Electroscopes

Use the following information to answer Q63:



Q63: When the negatively charged rod is held near the knob on the electroscope, the knob will have

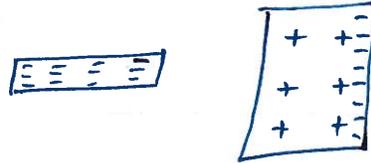
- a. A balance of charges
- b. A negative charge
- c. A positive charge
- d. Zero charge

KEY

Q64: A negatively-charged rod is brought near an uncharged piece of paper. A force of attraction results because the

- a. Paper gains protons
- b. Paper loses electrons
- c. Protons rearrange themselves
- d. Electrons rearrange themselves

Protons never move. Ever!



- ① Paper electrons pushed to far side.
- ② Negative rod attracts to positive side of paper.

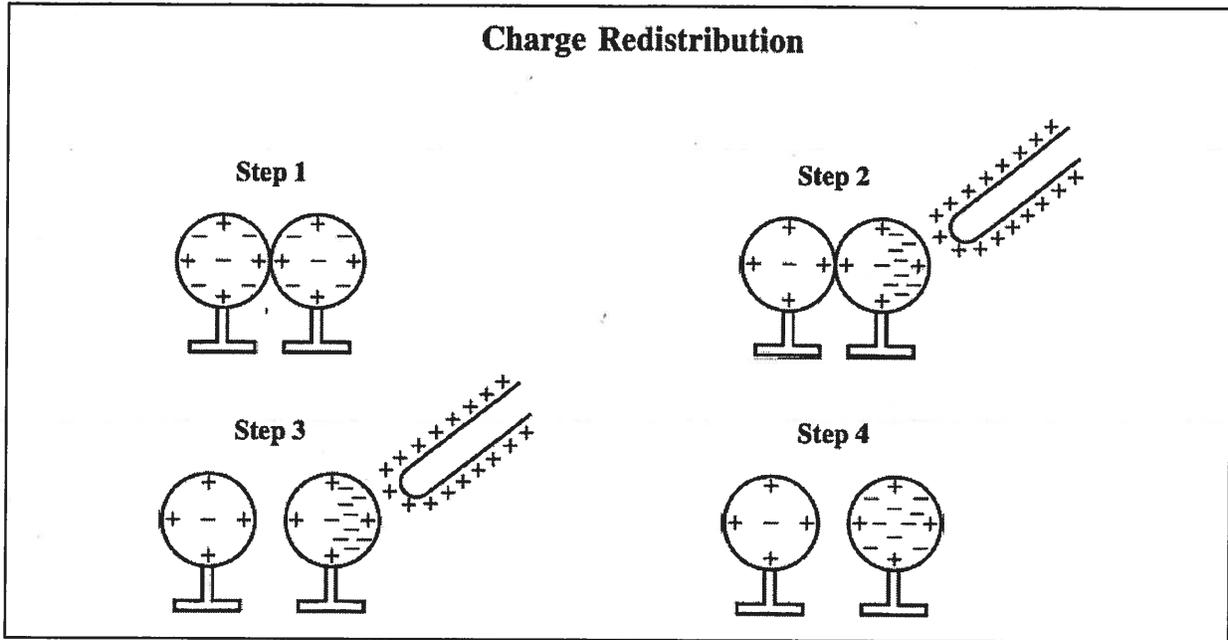
Use the following information to answer Q70:

A negatively charged rod is brought near the knob of a neutral electroscope.

Q70: When the negatively charged rod is close to the knob of the electroscope, the electroscope becomes charged

- a. Positively on both the knob and the leaves
- b. Negatively on both the knob and the leaves
- c. Positively on the knob and negatively on the leaves → Charge separation.
- d. Negatively on the knob and positively on the leaves

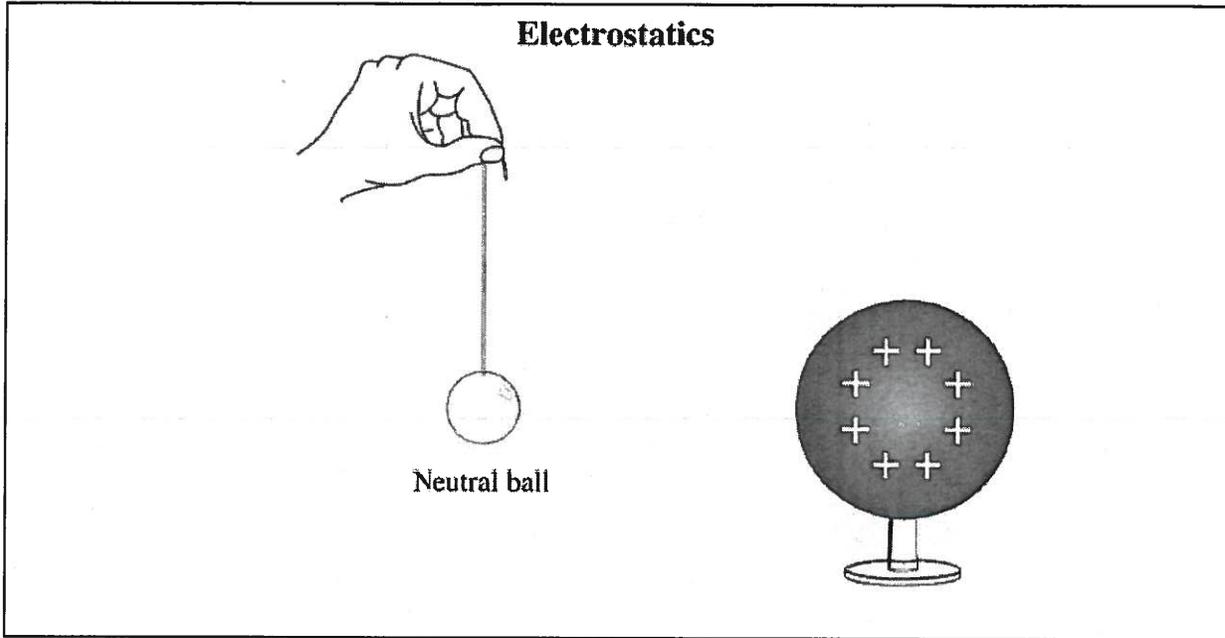
Use the following information to answer Q74:



Q74: The overall process indicated by steps 1 to 4 is

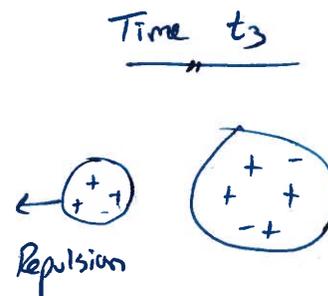
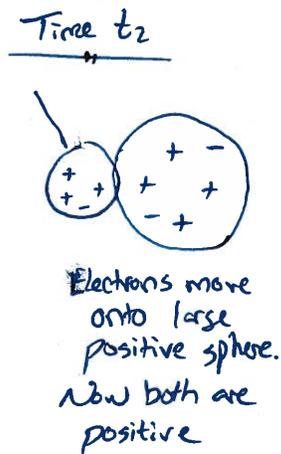
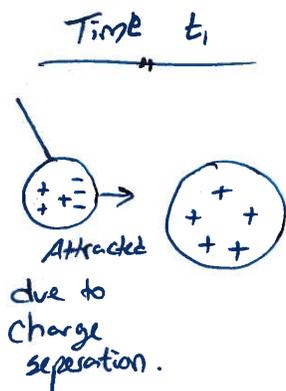
- a. Magnetization → second half of Unit 2 concept.
- b. Polarization → Unit 3 concept involving light.
- c. Conduction → Rod didn't touch spheres.
- d. Induction

Use the following information to answer Q75:

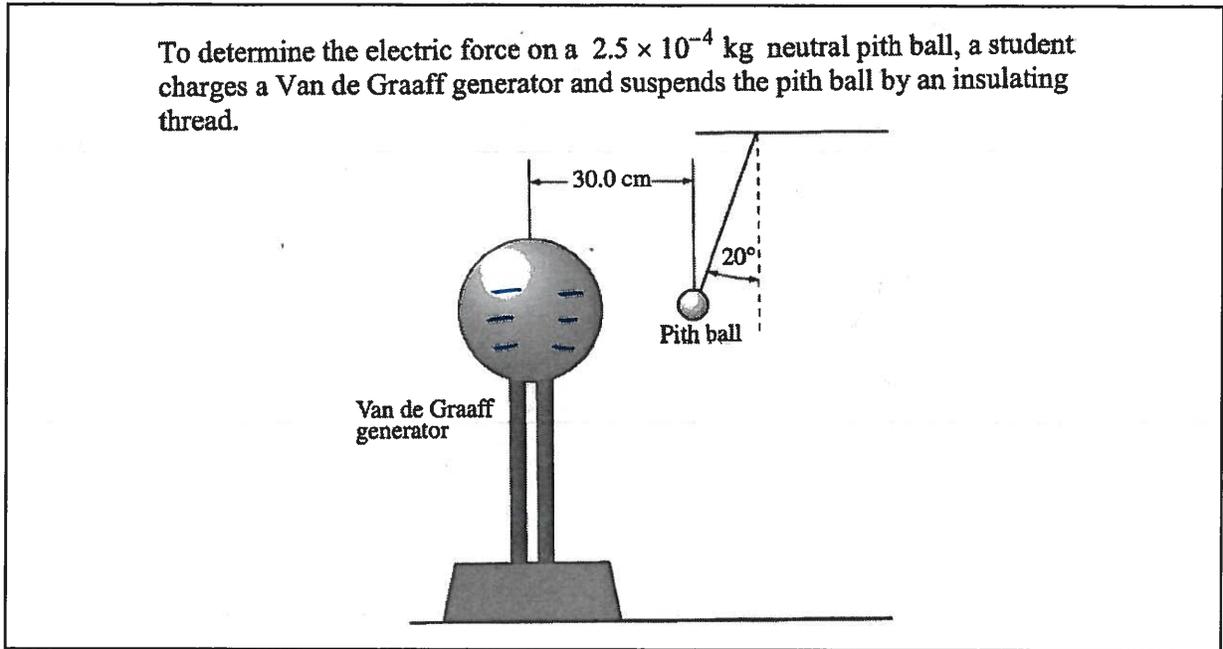


Q75: A neutral Styrofoam ball covered with tinfoil is suspended by a thread and moved toward a charged metal sphere. The ball will be

- a. Unaffected by the sphere until it touches, then attracted
- b. Unaffected by the sphere until it touches, then repelled
- c. Attracted to the sphere until it touches, then repelled**
- d. Repelled by the sphere before and after it touches



Use the following information to answer Q80:

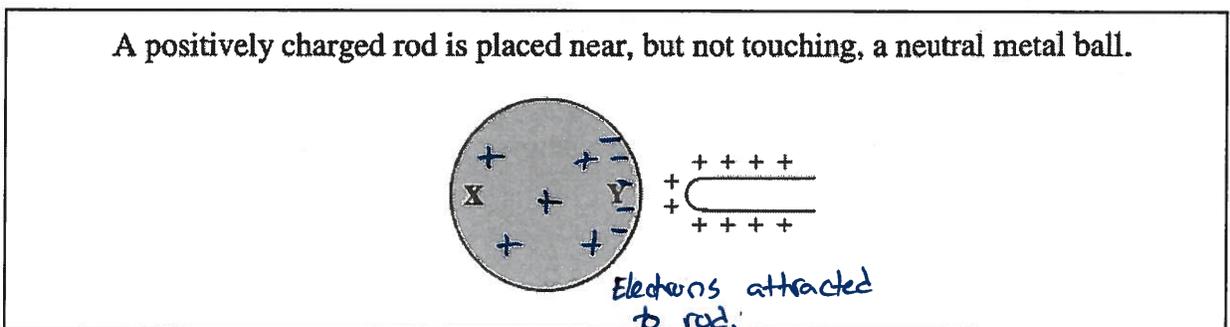


Q80: When the neutral pith ball is placed near the charged Van de Graaff generator, the pithball is attracted to the generator as a result of

- a. Induction → Net charge of pith ball is still zero, but charge separation has occurred.
- b. Grounding
- c. Conduction
- d. Induction and grounding



Use the following information to answer Q83:

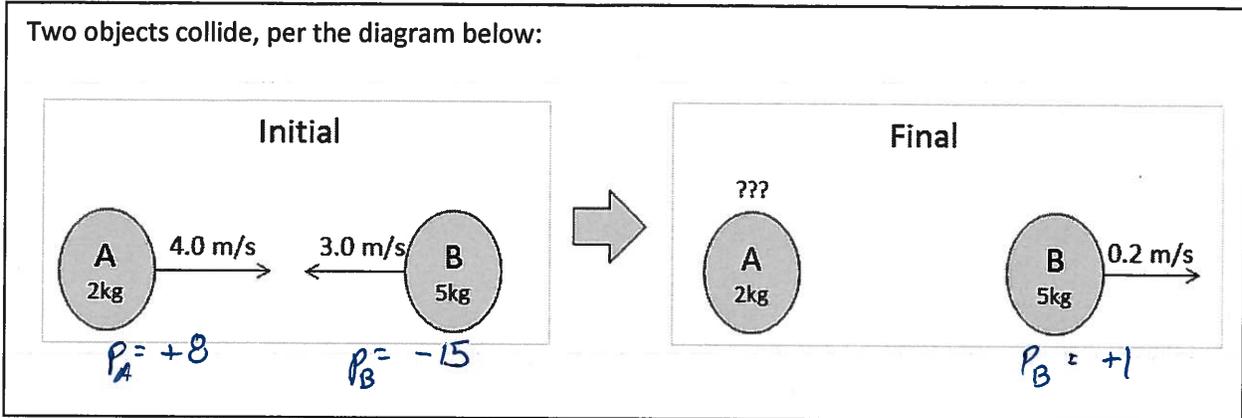


Q83: As a result of the rod's position, side X of the ball becomes relatively

- a. Negative and the ball is repelled from the rod
- b. Positive and the ball is repelled from the rod
- c. Negative and the ball is attracted to the rod
- d. Positive and the ball is attracted to the rod

Cumulative Review from Previous Units

Use the following information to answer Q1-Q2:



Q1: The final speed of Object A is ____ m/s.

(Record your three digit answer in the Numerical Response boxes below)

4 . 0 0

$$\begin{aligned}
 p_i &= p_f \\
 (+8) + (-15) &= \vec{p}_{A_f} + (+1) \\
 \vec{p}_{A_f} &= -8 \text{ kg m/s} \\
 \vec{v}_{A_f} &= -4 \text{ m/s [R]} \\
 \vec{v}_{A_f} &= 4 \text{ m/s [L]}
 \end{aligned}$$

Q2: is the collision elastic? Explain.

Initial

$$\begin{aligned}
 E_{K_A} &= \frac{1}{2}(2)(4)^2 = 16 \text{ J} \\
 E_{K_B} &= \frac{1}{2}(5)(3)^2 = 22.5 \text{ J} \\
 \hline
 &38.5 \text{ J}
 \end{aligned}$$

Final

$$\begin{aligned}
 E_{K_A} &= \frac{1}{2}(2)(4)^2 = 16 \text{ J} \\
 E_{K_B} &= \frac{1}{2}(5)(0.2)^2 = 0.1 \text{ J} \\
 \hline
 &16.1 \text{ J}
 \end{aligned}$$

$$\begin{array}{ccc}
 E_{K_i} & \underline{vs} & E_{K_f} \\
 38.5 \text{ J} & \underline{vs} & 16.1 \text{ J}
 \end{array}$$

Not elastic. Lots of E_K converted into something else.