**Static Electricity**

**Questions from a Conceptual Course**

**Category 1: Electrical Nature of Matter**

**Question 1:**

aa. **TRUE** or **FALSE**:

An object that is electrically neutral does not possess any charges inside of it.

a. True b. False

**Question 2:**

aa. **TRUE** or **FALSE**:

A negatively charged object does not possess any protons.

a. True b. False

**Question 3:**

aa. **TRUE** or **FALSE**:

A negatively charged object does not possess any electrons.

a. True b. False

**Question 4:**

aa. **TRUE** or **FALSE**:

A positively charged object does not possess any electrons.

a. True b. False

**Question 5:**

aa. **TRUE** or **FALSE**:

A positively charged object does not possess any protons.

a. True b. False

**Question 6:**

aa. Which one of these statements is true of a neutral or uncharged object?

a. A neutral object does not have any charged particles in it.

b. A neutral object does not have any protons or electrons in it.

c. A neutral object has equal numbers of protons and electrons.

d. The protons and electrons in a neutral object do not have any charge.

**Question 7:**

aa. Which one of these statements is true of a positively charged object?

a. There are more protons than electrons in a positively charged object.

b. Protons are the only charged particles present in a positively charged object.

c. Electrons are the only charged particles present in a positively charged object.

d. The electrons and protons in a positively charged object have a positive charge.

**Question 8:**

aa. Which one of these statements is true of a negatively charged object?

a. There are more electrons than protons in a negatively charged object.

b. Protons are the only charged particles present in a negatively charged object.

c. Electrons are the only charged particles present in a negatively charged object.

d. The electrons and protons in a negatively charged object have a negative charge.

**Question 9:**

aa. A positively charged object contains \_\_\_\_\_.

a. only protons b. only electrons

c. more protons than electrons d. more electrons than protons

**Question 10:**

aa. A negatively charged object contains \_\_\_\_\_.

a. only protons b. only electrons

c. more protons than electrons d. more electrons than protons

**Question 11:**

aa. A neutral or uncharged object contains \_\_\_\_.

a. only neutrons b. no charges

c. uncharged protons and electrons d. equal numbers of protons and electrons

**Question 12:**

aa. Which of the following particles are present in the nucleus of an atom?

a. Protons only b. Neutrons only

c. Protons and neutrons d. Electrons and protons

**Question 13:**

aa. The nucleus of an atom contains \_\_\_\_\_.

a. Protons only b. Neutrons only

c. Protons and neutrons d. Electrons and protons

**Question 14:**

aa. The protons of an atom are \_\_\_\_\_ and located \_\_\_\_\_.

a. positively charged, inside the nucleus

b. negatively charged, inside the nucleus

c. positively charged, outside the nucleus

d. negatively charged, outside the nucleus

**Question 15:**

aa. The electrons of an atom are \_\_\_\_\_ and located \_\_\_\_\_.

a. positively charged, inside the nucleus

b. negatively charged, inside the nucleus

c. positively charged, outside the nucleus

d. negatively charged, outside the nucleus

**Question 16:**

aa. Which one of the following statements is true of a proton?

a. A proton has no charge and is located inside the nucleus.

b. A proton is positively charged and located inside the nucleus.

c. A proton is negatively charged and located inside the nucleus.

d. A proton is negatively charged and located outside the nucleus.

**Question 17:**

aa. Which one of the following statements is true of a neutron?

a. A neutron has no charge and is located inside the nucleus.

a. A neutron has no charge and is located outside the nucleus.

b. A neutron is positively charged and located inside the nucleus.

c. A neutron is negatively charged and located outside the nucleus.

**Question 18:**

aa. Which one of the following statements is true of an electron?

a. An electron has no charge and is located inside the nucleus.

b. An electron is positively charged and located inside the nucleus.

c. An electron is negatively charged and located inside the nucleus.

d. An electron is negatively charged and located outside the nucleus.

**Question 19:**

aa. The force that holds particles together in the nucleus of an atom is very strong. What significance does this have for electrostatic experiments performed during this unit?

a. The only particles that move are the particles outside of the nucleus.

b. One must be careful to follow directions so that the nucleus is not disturbed.

c. Some objects are insulators and prevent these nuclear particles from moving.

**Question 20:**

aa. **TRUE** or **FALSE**:

In electrostatic experiments, objects become charged positively by either gaining protons or losing electrons.

a. True b. False

**Question 21:**

aa. When rubbed with a plastic bag, a sample of glass becomes charged positively. This occurs because \_\_\_\_\_.

a. protons are created from nothing

b. protons are transferred from the bag to the glass

c. electrons are transferred from the glass to the bag.

d. Both b and c occur.

**Question 22:**

aa. Which one of the following statements describes how a neutral object becomes charged negatively during an electrostatic experiment?

a. Rubbing or touching creates positive energy from nothing.

b. Rubbing or touching creates electrons at a location where they did not previously exist.

c. Protons are transferred to the object when rubbed with or touched to another object.

d. Electrons are transferred to the object when rubbed with or touched to another object.

**Question 23:**

aa. Which one of the following statements describes how a neutral object becomes charged positively during an electrostatic experiment?

a. Rubbing or touching creates positive energy from nothing.

b. Rubbing or touching creates protons at a location where they did not previously exist.

c. Protons are transferred to the object when rubbed with or touched to another object.

d. Electrons are transferred to the object when rubbed with or touched to another object.

**Question 24:**

aa. Which of the following are commonly gained and lost during electrostatic experiments?

a. Protons only b. Electrons only

c. Protons and electrons. d. Protons, electrons and neutrons.

**Question 25:**

aa. When conducting an electrostatic experiment, an object becomes charged positively. This occurred because \_\_\_\_\_.

a. the object gained protons from another object.

b. electrons were transferred from the object to another object.

c. the object gained positively charged electrons from another object.

d. protons were created during the charging process and deposited on the object.

**Question 26:**

aa. When conducting an electrostatic experiment, an object becomes charged negatively. This occurred because \_\_\_\_\_.

a. the object gained electrons from another object.

b. electrons were transferred from the object to another object.

c. the object gained negatively charged protons from another object.

d. electrons were created during the charging process and deposited on the object.

**Question 27:**

aa. Certain materials are known as insulators and other materials are conductors. Which of the following is **NOT** a distinction between insulators and conductors?

a. Insulators can be charged by friction; conductors are charged by contact to a VDG.

b. Conductors lose their charge when touched; insulators keep their charge when touched.

c. Insulators can only become charged negatively; conductors can b positive or negative.

d. Charge spreads over the entire surface of a conductor; it remains localized in an insulator.

**Question 28:**

aa. An insulator becomes charged negatively. It is brought near paper bits and found to attract them. It is then touched by ones hand and brought near paper bits again. Which statement explains what would be observed the second time the object is brought near paper bits?

a. The object keeps its charge when touched; it thus attracts the paper bits.

b. The object loses its charge when touched; it will not attract the paper bits.

c. The object becomes charged positively when touched; it repels the paper bits.

d. The object gains even more charge when touched; it will attract the paper bits even more.

**Question 29:**

aa. A conductor becomes charged negatively. It is brought near paper bits and found to attract them. It is then touched by ones hand and brought near paper bits again. Which statement explains what would be observed the second time the object is brought near paper bits?

a. The object keeps its charge when touched; it thus attracts the paper bits.

b. The object loses its charge when touched; it will not attract the paper bits.

c. The object becomes charged positively when touched; it repels the paper bits.

d. The object gains even more charge when touched; it will attract the paper bits even more.

**Question 30:**

aa. In one of our lab experiences, an aluminum pie plate was charged by induction. The pie plate was equipped with a Styrofoam™ cup for a handle. Why was the Styrofoam™ handle used in these procedures?

a. Styrofoam™ is inexpensive and makes a great handle for lifting and moving the pie plate.

b. Styrofoam™ is inexpensive and not harmful to the environment; what more could one ask for in a handle.

c. The pie plate can’t be touched or it will lose its charge; Styrofoam™ is an insulator and prevents such a charge loss.

**Question 31:**

aa. A foam plate is charged negatively by rubbing its entire top surface with animal fur. Which diagram represents the manner in which excess charge organizes itself on the foam plate?

a. b. c.

*Top*

*Bottom*

**Question 32:**

aa. Which statement describes the difference between an insulator and a conductor?

a. Insulators gain electrons; conductors lose electrons.

b. Insulators can gain or lose electrons; conductors can only lose electrons.

c. Electrons can flow freely through insulators; they do not move through conductors.

d. Electrons can flow freely through conductors; they do not move through insulators.

**Question 33:**

aa. **TRUE** or **FALSE**:

When an insulator becomes charged, the charge evenly distributes itself across the entire surface.

a. True b. False

**Question 34:**

aa. **TRUE** or **FALSE**:

When a conductor becomes charged, the charge evenly distributes itself across the entire surface.

a. True b. False

**Question 35:**

aa. **TRUE** or **FALSE**:

A plastic tube is charged. If a person directly touches the tube, the tube will lose its charge.

a. True b. False

**Question 36:**

aa. **TRUE** or **FALSE**:

An aluminum pie plate is charged. If a person directly touches the pie plate, the plate will lose its charge.

a. True b. False

**Question 37:**

aa. **TRUE** or **FALSE**:

A plastic tube is charged. Even when a person directly touches the tube, the tube will still keep its charge.

a. True b. False

**Question 38:**

aa. **TRUE** or **FALSE**:

An aluminum pie plate is charged. Even when a person directly touches the pie plate, the plate will still keep its charge.

a. True b. False

**Question 39:**

aa. Which statement describes what happens to an object when it becomes *polarized*?

a. Electrons are added or removed from the object.

b. The object is transformed from a charged to a neutral object.

c. The object is touched by a neutral object and becomes charged.

d. Electrons move inside the object so that one side becomes positive and the other negative.

**Question 40:**

aa. Polarizing an object involves \_\_\_\_.

a. adding electrons to the object

b. removing the charge from the object

c. removing excess electrons from the object

d. inducing electrons within the object to move

**Question 41:**

aa. What is the end result when a neutral object is polarized?

a. The object acquires an overall charge and is no longer neutral.

b. The object acquires a positive and a negative side but remains a neutral object.

c. The object loses its electrons and protons and no longer has electrical properties.

d. Nonsense! Only charged objects can be polarized.

**Question 42:**

aa. A negatively charged balloon is brought near to a metal pop can as shown in the diagram at the right. Which statement describes what happens as the balloon approaches the can?

a. Electrons move from the balloon to the can.

b. Electrons move from the can to the balloon.

c. Electrons within the can move away from the balloon's side.

d. Electrons within the can move towards from the balloon's side.

**Question 43:**

aa. A positively charged balloon is brought near to a metal pop can as shown in the diagram at the right. Which statement describes what happens as the balloon approaches the can?

a. Electrons move from the balloon to the can.

b. Electrons move from the can to the balloon.

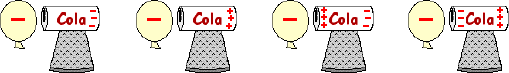
c. Electrons within the can move away from the balloon's side.

d. Electrons within the can move towards from the balloon's side.

**Question 44:**

aa. A negatively charged balloon is brought near to a metal pop can. Which diagram shows the arrangement of charge on the pop can as the balloon is held near it?

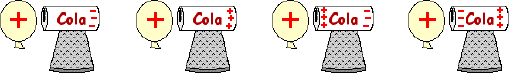
a. b. c. d.



**Question 45:**

aa. A positively charged balloon is brought near to a metal pop can. Which diagram shows the arrangement of charge on the pop can as the balloon is held near it?

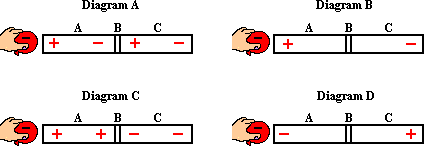
a. b. c. d.



**Question 46:**

aa. A negatively charged balloon is brought near the three objects shown below. Object A is a conductor. Object B is a very thin insulator. Object C is a conductor.



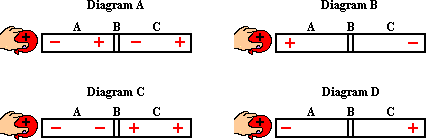
 Which of the following diagrams accurately depicts the arrangement of charge on Objects A and C?

**Question 47:**

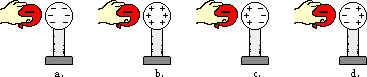
aa. A positively charged balloon is brought near the three objects shown below. Object A is a conductor. Object B is a very thin insulator. Object C is a conductor.



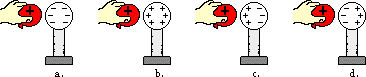
Which of the following diagrams accurately depicts the arrangement of charge on Objects A and C?



**Question 48:**

aa. A negatively charged balloon is brought near a neutral, conducting sphere. Which diagram below depicts the arrangement of charge on the neutral sphere?

**Question 49:**

aa. A positively charged balloon is brought near a neutral, conducting sphere. Which diagram below depicts the arrangement of charge on the neutral sphere?

**Category 2: Charging Methods**

**Question 50:**

aa. A vinyl tube is rubbed with animal fur. The vinyl tube is brought near paper bits and observed to attract them. The vinyl tube has been charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 51:**

aa. An acrylic ceiling tile is rubbed with animal fur. The acrylic tile is brought near paper bits and observed to attract them. The acrylic tile has been charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 52:**

aa. A glass test tube is rubbed with a plastic bag. The glass tube is brought near paper bits and observed to attract them. The glass tube has been charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 53:**

aa. An aluminum pie plate is touched to the charged sphere of a Van de Graaff generator. The aluminum plate is brought near paper bits and observed to attract them. The aluminum plate has been charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 54:**

aa. A brass bar is touched to the charged sphere of a Van de Graaff generator. The brass bar is brought near paper bits and observed to attract them. The brass bar has been charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 55:**

aa. A foam square is charged by rubbing it with animal fur. A neutral aluminum pie plate is then held above the foam square. The pie plate is touched by a finger and subsequently becomes charged. The aluminum pie plate has become charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 56:**

aa. Two neutral objects are rubbed together and subsequently become charged. The objects have become charged by the method of \_\_\_\_\_.

a. friction b. induction

c. conduction d. polarization

**Question 57:**

aa. A glass test tube is rubbed with a plastic bag. The glass test tube becomes charged with a positive type of charge. During the rubbing process, \_\_\_\_\_.

a. positive energy is created and deposited upon the glass test tube

b. protons are removed from the plastic bag and transferred to the glass test tube

c. electrons are removed from the glass test tube and transferred to the plastic bag

d. protons are created by the frictional energy and deposited on the glass test tube

**Question 58:**

aa. Object A consists of a material that has a greater affinity (or love) for electrons than Object B. When the two objects are rubbed together, one would observe that \_\_\_\_\_.

a. Object A becomes charged negatively and Object B remains neutral.

b. Object B becomes charged positively and Object A remains neutral.

c. Object A becomes charged negatively and Object B becomes charged positively.

d. Object A becomes charged positively and Object B becomes charged negatively.

**Question 59:**

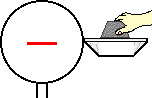
aa. When two objects are rubbed together, there is a transfer of electrons between them. What is the result of this transfer?

a. The two objects become charged with the same type of charge.

b. The two objects become charged with an opposite type of charge.

c. The two objects become charged but there is no way to predict whether like or opposite.

**Question 60:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a negatively charged Van de Graaff generator. The pie plate becomes charged by the method of \_\_\_\_\_.

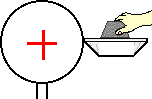
a. friction

b. induction

c. conduction

d. polarization

**Question 61:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a positively charged Van de Graaff generator. The pie plate becomes charged by the method of \_\_\_\_\_.

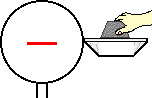
a. friction

b. induction

c. conduction

d. polarization

**Question 62:**

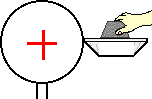
aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a negatively charged Van de Graaff generator. What type of charge (if any) does the pie plate have once it is pulled away?

a. Positive

b. Negative

c. No charge at all (neutral)

**Question 63:**

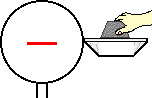
aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a positively charged Van de Graaff generator. What type of charge (if any) does the pie plate have once it is pulled away?

a. Positive

b. Negative

c. No charge at all (neutral)

**Question 64:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a negatively charged Van de Graaff generator. Once pulled away, the aluminum pie plate is charged \_\_\_\_\_ by the method of \_\_\_\_\_.

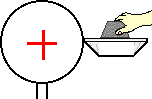
a. positively, conduction (contact)

b. negatively, conduction (contact)

c. positively, induction

d. negatively, induction

**Question 65:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a positively charged Van de Graaff generator. Once pulled away, the aluminum pie plate is charged \_\_\_\_\_ by the method of \_\_\_\_\_.

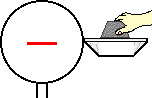
a. positively, conduction (contact)

b. negatively, conduction (contact)

c. positively, induction

d. negatively, induction

**Question 66:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a negatively charged Van de Graaff generator.

The aluminum pie plate becomes charge \_\_\_\_\_\_. During the charging process electrons move from \_\_\_\_\_ to the \_\_\_\_\_.

Select the three words that accurately fill in the three blanks of the above sentence in the appropriate order.

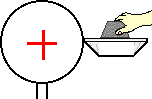
a. positively, Van de Graaff generator, aluminum pie plate

b. positively, aluminum pie plate, Van de Graaff generator

c. negatively, Van de Graaff generator, aluminum pie plate

d. negatively, aluminum pie plate, Van de Graaff generator

**Question 67:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a positively charged Van de Graaff generator.

The aluminum pie plate becomes charge \_\_\_\_\_\_. During the charging process electrons move from \_\_\_\_\_ to the \_\_\_\_\_.

Select the three words that accurately fill in the three blanks of the above sentence in the appropriate order.

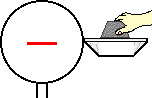
a. positively, Van de Graaff generator, aluminum pie plate

b. positively, aluminum pie plate, Van de Graaff generator

c. negatively, Van de Graaff generator, aluminum pie plate

d. negatively, aluminum pie plate, Van de Graaff generator

**Question 68:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a negatively charged Van de Graaff generator (VDG). Which statement describes the resulting charge on the pie plate and the manner by which it acquired the charge?

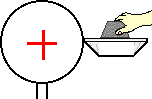
a. The pie plate becomes charged positively as electrons move from it to the VDG.

b. The pie plate becomes charged positively as protons move onto it from the VDG.

c. The pie plate becomes charged negatively as protons move from it to the VDG.

d. The pie plate becomes charged negatively as electrons move to it from the VDG.

**Question 69:**

aa. A neutral, aluminum pie plate is held by its insulating handle and touched to a positively charged Van de Graaff generator (VDG). Which statement describes the resulting charge on the pie plate and the manner by which it acquired the charge?

a. The pie plate becomes charged positively as electrons move from it to the VDG.

b. The pie plate becomes charged positively as protons move onto it from the VDG.

c. The pie plate becomes charged negatively as protons move from it to the VDG.

d. The pie plate becomes charged negatively as electrons move to it from the VDG.

**Question 70:**

aa. A negatively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched. When touched, electrons move \_\_\_\_\_.

a. from the can to the hand

b. from the hand to the can

c. from the balloon to the can

d. from the balloon to the can to the hand

**Question 71:**

aa. A positively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched. When touched, electrons move \_\_\_\_\_.

a. from the can to the hand

b. from the hand to the can

c. from the can to the balloon

d. from the hand to the can to the balloon

**Question 72:**

aa. A negatively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched. When touched, the can becomes charged \_\_\_\_\_.

a. positively

b. negatively

c. Nonsense! This process will not charge the can.

**Question 73:**

aa. A positively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched. When touched, the can becomes charged \_\_\_\_\_.

a. positively

b. negatively

c. Nonsense! This process will not charge the can.

**Question 74:**

aa. A negatively charged balloon is held near a neutral, aluminum can. This causes the can to be \_\_\_\_\_.

a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 75:**

aa. A positively charged balloon is held near a neutral, aluminum can. This causes the can to be \_\_\_\_\_.

a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 76:**

aa. A negatively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched and the can becomes charged. This is an example of charging by \_\_\_\_\_.

a. friction

b. induction

c. conduction (contact)

**Question 77:**

aa. A positively charged balloon is held near a neutral, aluminum can. The opposite side of the can is touched and the can becomes charged. This is an example of charging by \_\_\_\_\_.

a. friction

b. induction

c. conduction (contact)

**Question 78:**

aa. A negatively charged balloon is brought near a neutral, conducting sphere. This causes the sphere to be \_\_\_\_\_.

a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 79:**

aa. A positively charged balloon is brought near a neutral, conducting sphere. This causes the sphere to be \_\_\_\_\_.

a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 80:**

aa. A negatively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched. When touched, electrons move \_\_\_\_\_.

a. from the sphere to the hand

b. from the hand to the sphere

c. from the balloon to the sphere

d. from the balloon to the sphere to the hand

**Question 81:**

aa. A positively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched. When touched, electrons move \_\_\_\_\_.

a. from the sphere to the hand

b. from the hand to the sphere

c. from the sphere to the balloon

d. from the hand to the sphere to the balloon

**Question 82:**

aa. A negatively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched and the sphere becomes charged. This is an example of charging by \_\_\_\_\_.

a. friction

b. induction

c. conduction (contact)

**Question 83:**

aa. A positively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched and the sphere becomes charged. This is an example of charging by \_\_\_\_\_.

a. friction

b. induction

c. conduction (contact)

**Question 84:**

aa. A negatively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched and the sphere becomes charged \_\_\_\_\_

a. positively

b. negatively

c. Nonsense! This process will not charge the sphere.

**Question 85:**

aa. A positively charged balloon is brought near a neutral, conducting sphere. The opposite side of the conducting sphere is touched and the sphere becomes charged \_\_\_\_\_.

a. positively

b. negatively

c. Nonsense! This process will not charge the sphere.

**Question 86:**

aa. A neutral aluminum pie plate is brought near a negatively charged foam square. This causes the aluminum pie plate to be \_\_\_\_\_.

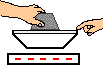
a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 87:**

aa. A neutral aluminum pie plate is brought near a negatively charged foam square. The top of the aluminum pie plate is touched by a hand and becomes charged. This is an example of \_\_\_\_\_.

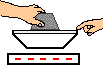
a. charging by friction

b. charging by induction

c. charging by conduction (contact)

d. Nonsense! This process would never charge the pie plate.

**Question 88:**

aa. A neutral aluminum pie plate is brought near a negatively charged foam square. The top of the aluminum pie plate is touched by a hand. When touched, electrons move \_\_\_\_\_.

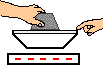
a. from the hand to the pie plate

b. from the pie plate to the hand

c. from the foam square to the pie plate

d. from the foam square to the pie plate to the hand

**Question 89:**

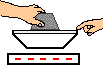
aa. A neutral aluminum pie plate is brought near a negatively charged foam square. The top of the aluminum pie plate is touched by a hand. This causes the pie plate to become charged \_\_\_\_\_.

a. positively

b. negatively

c. Nonsense! This would not cause the pie plate to be charged.

**Question 90:**

aa. A neutral aluminum pie plate is brought near a negatively charged foam square. The top of the aluminum pie plate is touched by a hand and becomes charged. This is an example of \_\_\_\_\_.

a. charging by friction

b. charging by induction

c. charging by conduction (contact)

**Question 91:**

aa. A neutral aluminum pie plate is brought near a positively charged acetate square. This causes the aluminum pie plate to be \_\_\_\_\_.

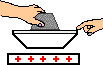
a. grounded

b. polarized

c. charged negatively

d. charged positively

**Question 92:**

aa. A neutral aluminum pie plate is brought near a positively charged acetate square. The top of the aluminum pie plate is touched by a hand and becomes charged. This is an example of \_\_\_\_\_.

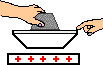
a. charging by friction

b. charging by induction

c. charging by conduction (contact)

d. Nonsense! This process would never charge the pie plate.

**Question 93:**

aa. A neutral aluminum pie plate is brought near a positively charged acetate square. The top of the aluminum pie plate is touched by a hand. When touched, electrons move \_\_\_\_\_.

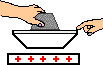
a. from the hand to the pie plate

b. from the pie plate to the hand

c. from the square to the pie plate

d. from the square to the pie plate to the hand

**Question 94:**

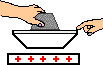
aa. A neutral aluminum pie plate is brought near a positively charged acetate square. The top of the aluminum pie plate is touched by a hand. This causes the pie plate to become charged \_\_\_\_\_.

a. positively

b. negatively

c. Nonsense! This would not cause the pie plate to be charged.

**Question 95:**

aa. A neutral aluminum pie plate is brought near a positively charged acetate square. The top of the aluminum pie plate is touched by a hand and becomes charged. This is an example of \_\_\_\_\_.

a. charging by friction

b. charging by induction

c. charging by conduction (contact)

**Question 96:**

aa. The law of conservation of charge states that charge is neither created nor destroyed. Which one of the following observations violates this law?

a. A plastic tube is rubbed with animal fur and becomes charged negatively.

b. A negatively charged foam plate is used to charge an aluminum pie plate by induction.

c. An aluminum pie plate is touched to a Van de Graaff generator and becomes charged negatively.

d. Nonsense! Each one of these observations is consistent with the law of conservation of charge.

**Question 97:**

aa. The law of conservation of charge states that charge is neither created nor destroyed. Which of the following statements is consistent with this law?

a. All charging methods involve the transfer of electrons between two objects.

b. When charging an object by friction, the energy of rubbing is transformed into charge.

c. When charging an object by conduction, the act of touching creates electrons upon the touched object.

**Question 98:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a positively charged object.

i. Acetate that is rubbed with wool.

ii. Glass that is rubbed with polyester.

iii. Vinyl that is rubbed with rabbit fur.

a. Method iii.

b. Methods i. and ii.

c. Methods i. and iii.

d. Methods ii. and iii.

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

**Question 99:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a positively charged object.

i. Glass that is rubbed with rabbit fur.

ii. Styrofoam that is rubbed with wool.

iii. Acetate that is rubbed with silk.

a. Method iii.

b. Methods i. and ii.

c. Methods i. and iii.

d. Methods ii. and iii.

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

**Question 100:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a positively charged object.

i. Silicone rubber that is rubbed with silk

ii. Glass that is rubbed with vinyl.

iii. Acetate that is rubbed with rabbit fur.

a. Method ii.

b. Methods i. and iii.

c. Methods i. and ii.

d. Methods ii. and iii.

**Question 101:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a negatively charged object.

i. Acetate that is rubbed with wool.

ii. Glass that is rubbed with polyester.

iii. Vinyl that is rubbed with rabbit fur.

a. Method iii.

b. Methods i. and ii.

c. Methods i. and iii.

d. Methods ii. and iii.

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

**Question 102:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a negatively charged object.

i. Glass that is rubbed with rabbit fur.

ii. Styrofoam that is rubbed with wool.

iii. Acetate that is rubbed with silk.

a. Method iii.

b. Methods i. and ii.

c. Methods i. and iii.

d. Methods ii. and iii.

|  |
| --- |
| Rabbit fur |
| Acetate |
| Glass |
| Wool |
| Silk |
| Polyester |
| Styrofoam |
| Acrylic |
| Vinyl |
| Silicon rubber |

**Question 103:**

aa. The diagram at the right represents a triboelectric series. Objects located higher in the list have a lesser affinity for electrons than those located lower in the list. Use the list to determine which methods would result in a negatively charged object.

i. Silicone rubber that is rubbed with silk

ii. Glass that is rubbed with vinyl.

iii. Acetate that is rubbed with rabbit fur.

a. Method ii.

b. Methods i. and iii.

c. Methods i. and ii.

d. Methods ii. and iii.

**Category 3: Experimentation and Data Interpretation**

**Question 104:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a positively charged tape and observe attraction.

Test 2: They bring **Object A** near a negatively charged tape and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 105:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a positively charged tape and observe attraction.

Test 2: They bring **Object A** near a negatively charged tape and observe repulsion.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 106:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a positively charged tape and observe repulsion.

Test 2: They bring **Object A** near a negatively charged tape and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 107:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a positively charged tape and observe attraction.

Test 2: They bring **Object A** near neutral paper bits and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 108:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a negatively charged tape and observe attraction.

Test 2: They bring **Object A** near neutral paper bits and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 109:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a positively charged tape and observe repulsion.

Test 2: They bring **Object A** near neutral paper bits and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 110:**

aa. Two students are trying to decide whether or not **Object A** is charged. They perform the following two tests:

Test 1: They bring **Object A** near a negatively charged tape and observe repulsion.

Test 2: They bring **Object A** near neutral paper bits and observe attraction.

These two tests lead to the conclusion that Object A is \_\_\_\_\_.

a. charged negatively

b. charged positively

c. electrically neutral

d. charged, but with an unknown type of charge

**Question 111:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near some neutral paper bits and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge on **Object A**?

a. **Object A** is brought near an object of unknown charge and repulsion is observed.

b. **Object A** is brought near a positively charged balloon and attraction is observed.

c. Nonsense! Knowing that **Object A** attracts the paper bits is conclusive evidence that **Object A** is charged positively.

**Question 112:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near some neutral paper bits and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge on **Object A**?

a. **Object A** is brought near an object of unknown charge and attraction is observed.

b. **Object A** is brought near a positively charged balloon and repulsion is observed.

c. Nonsense! Knowing that **Object A** attracts the paper bits is conclusive evidence that **Object A** is charged positively.

**Question 113:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near some neutral paper bits and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge on **Object A**?

a. **Object A** is brought near an object of unknown charge and repulsion is observed.

b. **Object A** is brought near a negatively charged balloon and attraction is observed.

c. Nonsense! Knowing that **Object A** attracts the paper bits is conclusive evidence that **Object A** is charged positively.

**Question 114:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near some neutral paper bits and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge on **Object A**?

a. **Object A** is brought near an object of unknown charge and repulsion is observed.

b. **Object A** is brought near a negatively charged balloon and repulsion is observed.

c. Nonsense! Knowing that **Object A** attracts the paper bits is conclusive evidence that **Object A** is charged positively.

**Question 115:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near a positively charged strip of tape and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge (if any) on **Object A**?

a. **Object A** is brought near neutral paper bits and attraction is observed.

b. **Object A** is brought near an object of unknown charge type and repulsion is observed.

c. Nonsense! Knowing that **Object A** attracts the positively charged strip of tape is conclusive evidence that **Object A** is charged negatively.

**Question 116:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near a positively charged strip of tape and observe repulsion. Which one of the following additional test results would allow the students to determine the type of charge (if any) on **Object A**?

a. **Object A** is brought near neutral paper bits and attraction is observed.

b. **Object A** is brought near an object of unknown charge type and attraction is observed.

c. Nonsense! Knowing that **Object A** repels the positively charged strip of tape is conclusive evidence that **Object A** is charged positively.

**Question 117:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near a negatively charged strip of tape and observe attraction. Which one of the following additional test results would allow the students to determine the type of charge (if any) on **Object A**?

a. **Object A** is brought near neutral paper bits and attraction is observed.

b. **Object A** is brought near an object of unknown charge type and repulsion is observed.

c. Nonsense! Knowing that **Object A** attracts the negatively charged strip of tape is conclusive evidence that **Object A** is charged positively.

**Question 118:**

aa. Two students are trying to decide whether or not **Object A** is charged and what type of charge it has. They bring **Object A** near a negatively charged strip of tape and observe repulsion. Which one of the following additional test results would allow the students to determine the type of charge (if any) on **Object A**?

a. **Object A** is brought near neutral paper bits and attraction is observed.

b. **Object A** is brought near an object of unknown charge type and attraction is observed.

c. Nonsense! Knowing that **Object A** repels the negatively charged strip of tape is conclusive evidence that **Object A** is charged negatively.