Static Electricity

EXERCISE [PAGE 57]

Exercise | Q 1.1 | Page 57

Choose the correct option and fill in the blanks.

There is ..... between like charges.

1. **always repulsion**
2. always attraction
3. displacement of negative charge
4. displacement of positive charge
5. atom
6. molecule
7. steel
8. copper
9. plastic
10. inflated balloon
11. charged object
12. gold

Solution: There is always repulsion between like charges.

Exercise | Q 1.2 | Page 57

Choose the correct option and fill in the blanks.

..... is responsible for generation of electric charge in an object.

1. always repulsion
2. always attraction
3. **displacement of negative charge**
4. displacement of positive charge
5. atom
6. molecule
7. steel
8. copper
9. plastic

10. inflated balloon
11. charged object
12. gold

Solution: Displacement of negative charge is responsible for generation of electric charge in an object.

Exercise | Q 1.3 | Page 57

Choose the correct option and fill in the blanks.

A lightning conductor is made of a ..... strip.

1. always repulsion
2. always attraction
3. displacement of negative charge
4. displacement of positive charge
5. atom
6. molecule
7. steel
8. **copper**
9. plastic
10. inflated balloon
11. charged object
12. gold

Solution: A lightning conductor is made of a copper strip.

Exercise | Q 1.4 | Page 57

Choose the correct option and fill in the blanks.

..... does not get electrically charged easily by rubbing.

1. always repulsion
2. always attraction
3. displacement of negative charge
4. displacement of positive charge
5. atom
6. molecule

7. steel
8. copper
9. plastic
10. inflated balloon
11. charged object
12. **gold**

Solution: Gold does not get electrically charged easily by rubbing.

Exercise | Q 1.5 | Page 57

Choose the correct option and fill in the blanks.

There is ..... when opposite electric charge come near each other.

1. always repulsion
2. **always attraction**
3. displacement of negative charge
4. displacement of positive charge
5. atom
6. molecule
7. steel
8. copper
9. plastic
10. inflated balloon
11. charged object
12. gold

Solution: There is always attraction when opposite electric charge come near each other.

Exercise | Q 1.6 | Page 57

Choose the correct option and fill in the blanks.

A ..... can be detected with an electroscope.

1. always repulsion
2. always attraction
3. displacement of negative charge

4. displacement of positive charge
5. atom
6. molecule
7. steel
8. copper
9. plastic
10. inflated balloon
11. **charged object**
12. gold

Solution: A charged object can be detected with an electroscope.

Exercise | Q 2 | Page 57

Explain why it is not safe to go out with an umbrella when there is heavy rain, lightning or thunder.

Solution: Heavy rain and thundering is accompanied by lightning. Lightning is basically the discharge of huge amount of electric charges from clouds towards the ground. These charges may pass through the metallic rod of the umbrella to the person carrying it. Hence, the person might get severe electric shock and die. Thus, it is not advisable and safe to go out with an umbrella when there is heavy rain, lightning or thunder.

Exercise | Q 3.1 | Page 57

Answer in your own words.

How will you protect yourself from lightning?

Solution: Following are some safety measures to be followed to protect oneself from lightning:

If outdoor:
1. Avoid taking shelter under trees.
2. Avoid being near to any kind of metal objects which may include metal wires, fences, machinery and power appliances.
3. Take shelter inside a fully enclosed car with all the windows shut.

If indoor:
1. Turn off all the electrical appliances such as television and refrigerator.

Exercise | Q 3.2 | Page 57

Answer in your own words.

How are charges generated?

Solution: Charges are generated in an object when the object loses or gains some electrons or when there is displacement between the positive and negative charges of an object. Methods of generating charges are:

- Rubbing: When two insulators are rubbed with each other, one of them loses electrons and the other gains electrons. The one which gains electrons gets negatively charged and the other one gets positively charged.
- Conduction: When a charged body is brought in contact with an uncharged conductor, the conductor gets charged.
- Induction: When a charged body is brought near to a neutral body say a conductor or an insulator, the electrons and protons in the neutral body gets separated. Thus, the body acquires temporary charge as long as the charged body is kept near it.

Exercise | Q 3.3 | Page 57

Answer in your own words.

In the lightning conductor, what provision is made for spreading the electricity into the ground?

Solution: A pit is dug in the ground and is filled with coal and salt. A cast iron plate is placed upright in the pit and one end of the lightning conductor is connected to this plate. Also, a provision of pouring water into the pit is made. Thus, when the electric charges through the conductor is discharged into the pit, the water quickly spreads these charges into the ground and prevents damages.

Exercise | Q 3.4 | Page 57

Answer in your own words.

Why do farmers stick an iron staff into the ground while working in the field in rainy conditions?

Solution: In rainy conditions, there is very high chance of lightning striking the Earth. So, the farmer by putting an iron staff into the ground while working in the field in rainy condition, makes sure that he and his crops remains safe in case lightning occurs. This is because the iron staff will be more prone to lightning than the crops and his body because of the iron staff being tall and metallic in nature. Thus, the electric charges from the clouds will flow to the ground through the staff without affecting the plants in case of lightning during rainy weather.

Exercise | Q 3.5 | Page 57

Answer in your own words.

Why is lightning not seen everyday during the rainy season?

Solution: For lightning to happen, there must be some minimum amount of accumulation to happen in the clouds. So, it might be possible that this limit is not achieved everyday during rainy season because of which lightning does not occur everyday. Hence, we do not see lightning everyday during the rainy season.

Exercise | Q 4 | Page 57

What are the characteristics of a static electric charge?

Solution: The characteristics of a static electric charge are as follows:

- Charges exist in two types i.e. positive and negative. Positive charge is generally carried by a proton and negative charge by an electron.
- Like charges always attract each other and unlike charges always repel each other.

Exercise | Q 5.1 | Page 57

What is the damage caused by lightning?

Solution:

- A fire can start if the lightning strike makes contact with flammable material. These can include gas pipes, wood, paper, etc.
- If lightning follows electrical wiring, then the wires gets overheated which can cause a fire hazard.
- Lightning can cause damage to walls, concrete, plaster and glass of a building. It can damage the electrical appliances connected to damaged sockets.
- Lightning can damage tall trees and crops. It can even lead to forest fire.
- Lightning, if strikes on living beings, can take their lives.

Exercise | Q 5.2 | Page 57

How will you create awareness to prevent it?

Solution: These damages can be prevented if preventive guidelines against lightning is taught to each and every individual. The preventive measures can be propagated to people using different mediums such as books, T.V., radio, etc. Awareness programmes should be conducted in schools and societies to educate people and students about the wrath of lightning and measures to fight it. Following are some safety measures which should be told and followed by individuals when lightning strikes:

If outdoor:

1. Avoid taking shelter under trees.

2. Avoid being near to any kind of metal objects which may include metal wires, fences, machinery and power appliances.

3. Take shelter inside a fully enclosed car with all the windows shut.

If indoor:

1. Turn off all the electrical appliances such as television and refrigerator.