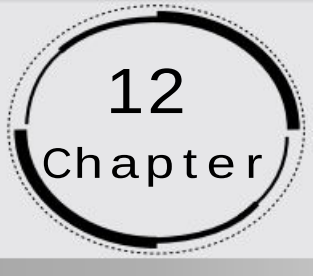
Some Natural Phenomena



1. Which of the following cannot be charged easily by friction?

(a) A plastic scale

(b) A copper rod

(c) An inflated balloon

(d) A woollen cloth

Ans: (b) A copper rod

When insulating materials such as plastic scales, balloons, and woollen clothes rub against each other, they may become electrically charged. Charging by friction is used to charge only non-conducting materials (poor conductors of electricity). As copper is a highly conducting material, it cannot be charged easily by friction.

2. When a glass rod is rubbed with a piece of silk cloth the rod

(a) and the cloth both acquire positive charge.

(b) becomes positively charged while the cloth has a negative charge.

(c) and the cloth both acquire negative charge.

(d) becomes negatively charged while the cloth has a positive charge.

Ans: (b) becomes positively charged while the cloth has a negative charge.

When an object is charged by rubbing it against another object, the two objects acquire opposite charges. By convention, it is considered that the charge acquired by the silk cloth is negative and the charge acquired by the glass rod is positive. Therefore, the glass rod becomes positively charged, whereas the silk cloth becomes negatively charged.

3. Write T against true and F against false in the following statements.

(a) Like charges attract each other. (T / F)

Ans: F

Like charges (positive-positive or negative-negative) repel each other, whereas unlike charges (positive-negative) attract each other.

(b) A charged glass rod attracts a charged plastic straw. (T / F)

Ans: T

Both objects have opposite charges on them. A charged glass rod (positively charged) attracts a charged plastic straw (negatively charged) because opposite charges attract each other.

(c) Lightning conductors cannot protect a building from lightning. (T / F)

Ans: F

When lightning strikes, the lightning conductor conducts all of the atmospheric charges directly to the Earth, keeping the building safe. As a result, a lightning conductor protects a building against lightning strikes.

(d) Earthquakes can be predicted in advance. (T / F)

Ans: F

Despite the fact that the causes of earthquakes are known, no instruments have been developed to detect them in advance. As a result, earthquakes cannot be predicted in advance.

4. Sometimes, a crackling sound is heard while taking off a sweater during winters. Explain.

Ans: When we take off a sweater during winter, the woollen sweater gets charged due to friction between the body and the sweater. The discharge of these electric charges produces tiny sparks of light and a crackling sound.

5. Explain why a charged body loses its charge if we touch it with our hand.

Ans: Electricity can flow through the human body because the human body is a conductor of electricity. When we come into contact with a charged object, our body conducts its charges to the Earth. That is why if we touch a charged body with our hand, it loses its charge. This is referred to as an electric discharge.

6. Name the scale on which the destructive energy of an earthquake is measured. An earthquake measures 3 on this scale. Would it be recorded by a seismograph? Is it likely to cause much damage?

Ans: The Richter scale is used to determine how destructive an earthquake is. The scale ranges from one to ten. A seismograph would record a reading of magnitude 3 on the Richter scale.

If the earthquake has a magnitude of 3 on the Richter scale, it is unlikely to cause significant damage. Earthquakes of a magnitude greater than 5 are generally considered destructive in nature.

7. Suggest three measures to protect ourselves from lightning.

Ans: Three protective measures against lightning are:

(i) Always remain in a covered area or stay indoors. If you are moving in a car, stay there until the lightning is over and keep the windows shut.

(ii) Do not bathe in running water during lightning.

(iii) Do not touch any electrical appliances, wires, telephone cables, metal pipes etc. during lightning.

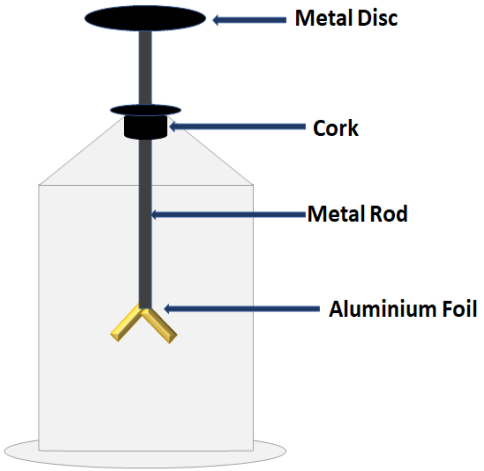
8. Explain why a charged balloon is repelled by another charged balloon whereas an uncharged balloon is attracted by another charged balloon?

Ans: A charged balloon repels another charged balloon because both carry the same type of charges and the same charges repel each other.

When an uncharged balloon is brought near to a charged balloon, the uncharged balloon acquires the opposite charge on its surface by the process of induction. Thus, an uncharged balloon is attracted by another charged balloon because opposite charges attract each other.

9. Describe with the help of a diagram an instrument which can be used to detect a charged body.

Ans: An electroscope is a device which is used to detect the charge on a body. It works on the principle that charges (positive-positive or negative-negative) repel each other while unlike charges (positive-negative) attract each other.



Electroscope

This device has a metal rod. At one end of the metal rod, two strips of aluminium foil are fixed and at the other end, there is a metal disc. The bottom of the rod and strips of aluminium foil are placed inside a conical flask for protection. When the metal disc of the electroscope is touched with a charged body (ebonite or glass rod), the aluminium strips diverge or move away from each other. This happens because some of the charges of the charged body are transferred to the aluminium strips through the metal rod. The nature of charges on both the aluminium strips is similar. Hence, both the strips of the aluminium foil move away from each other. If the body is not charged, then the two strips of aluminium remain as they are. They do not repel each other.

The extent of divergence depends upon the amount of charge on the electroscope. When the aluminium strips repel each other proves that the body is charged because repulsion is the sure test to detect if the body is charged or not through an electroscope.

10. List three states in India where earthquakes are more likely to strike.

Ans: The following are the three Indian states where earthquakes are more likely to occur:

(i) Jammu and Kashmir

(ii) Assam

(iii) Gujarat

11. Suppose you are outside your home and an earthquake strikes. What precaution would you take to protect yourself?

Ans: If we are outside our home and an earthquake strikes, then the following precautions must be followed:

(i) We should move to an open space away from tall buildings, tall trees, electric wires and poles.

(ii) If we are driving, we should slow down the vehicle and move it slowly to a clear spot away from buildings, electric poles, trees, etc. and stay there till the earthquake stops.

12. The weather department has predicted that a thunderstorm is likely to occur on a certain day. Suppose you have to go out on that day. Would you carry an umbrella? Explain.

Ans: In a thunderstorm, no one should carry an umbrella. Electric charges can travel from the cloud through the metallic rod of an umbrella during a thunderstorm accompanied by lightning. This could cause an electric shock to the person carrying it. As a result, carrying an umbrella during a lightning storm is dangerous.

Extended Learning — Activities and Projects

1. Open a water tap, adjust the flow so that it forms a thin stream. Charge a refill, bring it near the water stream. Observe. What happens? Write a long report on the activity. plz.. give long report on it

Ans: We observe that water stream is attracted towards the charged refill. It is just like as pieces of papers are attracted by the charged comb. It so happens because water stream and the charged refill have dissimilar charges.

Explanation:

please mark me as brainliest

2. Make your own charge detector. Take a paper strip roughly 10 cm × 3 cm. Give it a shape as shown in Fig. 12.15. Balance it on a needle. Bring a charged body near it. Observe what happens. Write a brief report, explaining its working.

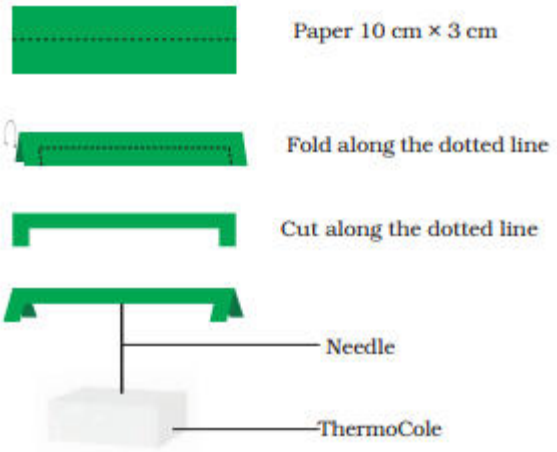


Fig. 12.15

Ans: Here's how it works:

Take a paper strip roughly 10 cm × 3 cm and give it a shape as shown in the image. Balance the paper strip on a needle which is attached to a ThermoCole.

Bring a charged body near the paper strip.

When the charged body is brought near the paper strip, the paper strip will start moving. This is because the charged body and the paper strip have dissimilar charges. This device is known as an electroscope and it demonstrates the interactions between charged objects and the behavior of electric charges.

3. This activity should be performed at night. Go to a room where there is a fluorescent tube light. Charge a balloon. Switch off the tube light so that the room is completely dark. Bring the charged balloon near the tubelight. You should see a faint glow. Move the balloon along the length of the tube and observe how the glow changes.

Caution : Do not touch the metal parts of the tube or the wires connecting the tube with the mains.

Ans: Here's how it works:

Charge a balloon by rubbing it on your hair or on your sweater. You will need to rub it quickly and repeatedly to build up a lot of charge for this experiment1.
Switch off the tube light so that the room is completely dark1.
Bring the charged balloon near the tube light1.
You should observe a faint glow1. Move the balloon along the length of the tube and notice how the glow changes1. This happens because when the charged balloon touches the bulb, electrons pass from the balloon to the bulb causing the bulb to emit small sparks of light1.

Please remember not to touch the metal parts of the tube or the wires connecting the tube with the mains for safety reasons1.

4. Find out if there is an organisation in your area which provides relief to those suffering from natural disaster. Enquire about the type of help they render to the victims of earthquakes. Prepare a brief report on the problems of the earthquake victims.

Ans: There are several organizations that provide relief to those suffering from natural disasters. One such organization is the Disaster Management & Relief department of the State Government of Rajasthan. This department is responsible for disaster-related relief work and activities, and it coordinates with other departments and organizations to provide assistance to those affected by natural disasters.

The problems faced by earthquake victims can be devastating. In addition to the physical damage caused by the earthquake itself, survivors may also face a range of other challenges. These can include psychological problems such as anxiety and depression, as well as practical issues such as lack of access to food, water, and medical care. Earthquake survivors may also face problems such as failure of NGOs, lack of public awareness, insufficient comprehensive rehabilitation programs, misallocation of resources, absence of local social capital, adoption of top-down approach.

Organizations like the Disaster Management & Relief department work to address these problems by providing assistance to those affected by natural disasters. They maintain, update and disseminate information to stakeholders and users for decision-making at multiple levels. They also automate the relief life cycle, such as filling online forms, GIS-based workflow, sanction generation and DBT's to beneficiaries under various relief schemes taken up by the DMRD department.