

Exercise Questions

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Select the correct option in Questions 1 and 2.

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.

Soln:

Answer is (b) A copper rod

Explanation:

Only non-conducting materials can be easily charged by friction. Copper is a highly conducting materials. Therefore, a copper rod 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.

Soln:

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

Explanation:

When two objects are rubbed against each other, they acquire opposite charges. By the law of convention, it is known that the rod acquires the positive charge and the cloth is acquiring the negative charge.

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

- (a) Like charges attract each other (T/F)
- (b) A charged glass rod attract a charged plastic straw (T/F)
- (c) Lightning conductor cannot protect a building from lightning (T/F)
- (d) Earthquakes can be predicted in advance (T/F)

Soln:

- a) False-Unlike charges attract each other while the like charges repel each other.
- b) True-A charged plastic straw has a negative charge on its surface while the glass rod has positive charges on its surface. Unlike charges attract each other so, they both attract each other.
- c) False -When lightning occurs, the atmospheric charges are transferred to the earth directly by a lightning conductor. Therefore the building is protected from lightning.
- d) False-Even though the earthquake causes are known, there are no instruments that are invented to detect them in advance. Therefore earthquakes cannot be predicted in advance.

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

Soln:

When we take out sweater, Woolen sweater gets charged due to friction between the sweater and the body. This results in crackling sound.

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

Soln:

The charges get conducted to the earth through our body when we touch it and the conductor loses its charge. This phenomenon is known as 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?

Soln:

Richter scale is used to measure the destructive energy of an earthquake. The scale has a reading from 1 to 10.

An earthquake measuring 3 would be recorded by a seismograph.

The magnitude of scale 3 would not cause much damage. An Earthquake of magnitude 5 is considered destructive in nature.

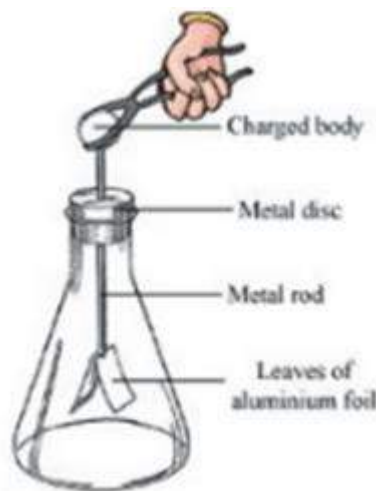
7. Suggest three measures to protect ourselves from lightning**Soln:**

Various ways to protect ourselves from lightning are

- (i) Always remain in a closed place and if you are in a car stay there until the lightning is over and keep the windows closed.
- (ii) Never touch any electrical wires, telephone cables, metal pipes.
- (iii) Never bath in running water, this may cause electric shock.

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

The surface charge on the balloons are of the same nature hence they get repelled. When a charged balloon is brought near an uncharged balloon due to the induction of charges, it acquires charges which are opposite in nature with that of a charged balloon. As unlike charges attract each other, the uncharged balloon gets attracted by the charged balloon.

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

It consists of a metal rod on which two leaves of aluminium foil are fixed to one end and a metal disc at the other end. The leaves are kept inside a conical flask and it is corked to isolate it from the atmospheric air.

When a charged body comes in contact with the metal disc, the aluminium leaves move away from each other because some charges get transferred to aluminium leaves through the metal rod. This process is called charging by conduction. The charges on the leaves and the charged body are of same in nature and thus the leaves of aluminium repel each other. If the body is not charged then they would attract each other.

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

Soln:

Gujarat, Assam and Jammu & Kashmir are the three states where an earthquake is more likely to strike.

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

Soln:

The following precautions should be taken when earthquake strikes

(a) Find and go to an open field and stay away from buildings, trees, electric wire and poles.

(b) If you are in a car, then drive to an open field and do not come out of your car.

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.

Soln:

No, one should not carry an umbrella during a thunderstorm. The thunderstorm is accompanied by lightning and the charges might travel from the cloud to the metal rod on the umbrella and might cause an electric shock to the person carrying it. So, it is not safe to carry an umbrella during lightning.