

## 8<sup>th</sup> Some natural phenomena (living Science)

### A. MULTIPLE-CHOICE QUESTIONS: Choose the most appropriate answer.

- like charges
  - always repel each other.
  - always attract each other.
  - can repel or attract each other depending on conditions.
  - can repel or attract each other depending on the quantity of charge.
- A body can be charged by
  - rubbing it against another body
  - touching it to a charged body.
  - bringing a charged body near it.
  - all of the above methods.
- The two bodies are rubbed against each other,
  - they acquire equal and similar charges.
  - they acquire equal and opposite charges.
  - they acquire unequal and similar charges.
  - they acquire unequal and opposite charges.
- The gold leaf electroscope can be used to
  - detect charge only
  - detect and measure charge only
  - detect, measure and find the nature of Charge
  - none of the above
- Electric charge can flow through
  - insulators.
  - both insulators and Inductors.
  - conductors.
  - neither insulators nor conductors.
- lightning conductor is a
  - piece of wire with spikes through which current can flow
  - substance that can be charged by clouds.
  - metal rod with spikes, ending in a copper plate buried in the ground, fixed to building to protect it from lightning.
  - copper plate buried in the ground below a building to protect it from lightning.
- To test if a body is charged or not you will use
  - another uncharged body.
  - a positively charged body
  - a negatively charged body
  - a positively and a negatively charged body.
- You are given an uncharged electroscope and a charged body. No other apparatus is allowed. You can use the electroscope to
  - only detect the charge.
  - detect and measure the charge.
  - detect, measure and find the nature of the charge.
  - neither of these since the electroscope is uncharged.

Ans: 1. a    2.d    3. b    4. c    5. b    6. c    7. d    8. b

### B. VERY SHORT-ANSWER QUESTIONS: Give one-word answers.

- When charges of static electricity flow through conductors we get current electricity. True or false?
- Two combs made of the same material are rubbed against your hair and brought near each other. Will they attract or repel each other?
- A negatively-charged object will ----- a positively-charged object.
- What kind of charge is produced in a silk cloth when it is rubbed against a glass rod?
- Under normal circumstances atoms contain equal number of positive and negative charges. True or false?
- Which charges in an atom are more free to move about positive or negative?
- Charging a body by bringing a charged body near it, but not touching it is called charging by \_\_\_\_\_.
- Charging a body by touching it with a charged body is called charging by \_\_\_\_\_.
- Name the instrument used for detecting and measuring charge.
- To find the nature of charge using a gold-leaf electroscope, should the electroscope be initially charged or uncharged?
- What is the flow of charge called? Can charge flow through an ebonite rod?
- The flow of heavy charge through air, accompanied by heat and light is called \_\_\_\_\_.
- Lightning is due to flow of charge between clouds. True or false?

14. An electroscope is charged by induction using a negatively-charged body. What charge will the electroscope acquire-as-positive or negative?
15. When charged by conduction a body acquires the (same / opposite) charge as the charging body.
16. The intensity of an earthquake is measured on the scale.
17. A \_\_\_\_\_ records the waves generated by an earthquake, known as waves.
18. An earthquake is most likely to occur in the centre of the tectonic plates. True or false?
19. Volcanic activity can also cause earthquakes. True or false?

Ans: 1. True    2. repel    3. attract    4. negative charge    5. True  
6. negative    7. induction    8. conduction    9. electroscope    10. charged  
11. electricity, yes    12. Electric discharge    13. True    14. negative  
15. same    16. Richter    17. seismogram, seismic    18. False    19. True

**C. SHORT-ANSWER QUESTIONS (TYPE I): Answer in a sentence or two.**

1. Why does a comb rubbed on hair attract pieces of paper?

Ans: The comb on rubbing became gets electrically charged and attract pieces of paper.

2. Under what conditions do charges attract or repel each other?

Ans: Like charges repel each other whereas opposite charges attract each other.

3. Why do we say that only repulsion is a sure test of charge on a body?

Ans: A charged body can attract an uncharged body and body with an opposite charge. Thus, repulsion alone is a sure test of whether a body is charged or not.

4. What do you mean by 'charging by conduction'? What kind of charge does the body acquire?

Ans: When a neutral object is charged by touching it with a charged body, it is called charging by conduction. The object acquires the same charge as that on the charged body.

5. What is 'charging by induction'? What kind of charge does the body acquire?

Ans: When a neutral object is charged by bringing a charged body near it without touching it, it is called charging by induction. The object acquires an opposite charge to that of the charged body.

6. What is the difference between conductors and non-conductors? Give two examples of each.

Ans: Substances which allow electric charges to flow through them are called conductors of electricity.

Examples: Metals like iron, copper, aluminium, etc.

Substances that do not allow electric charges to flow through them are called non-conductors or insulators of electricity. Examples: Plastic, rubber, wood, etc.

7. What is an electroscope?

Ans: An electroscope is a device used to detect and measure electric charge.

8. What is 'earthing'?

The process of transferring of charge from a charged object to the earth is known as earthing.

A lightning conductor on a building transfers the charges from a cloud to safely flow through it to the earth.

**D. SHORT-ANSWER QUESTIONS (TYPE H): Answer in about 30 words.**

1. Explain why, when two bodies, charged by rubbing them together, acquire equal and opposite charge.

Ans: Every atom has equal number of positive and negative electric charges. The positively charged particles are firmly bound in the atom while the negatively charged particles are more loosely bound. Thus, by rubbing it is possible to remove some of the negatively charged particles. This is why when two bodies are charged by rubbing them together one acquires positive charge by losing positively charge and other acquires negative charge by receiving negatively charge.

2. What is the difference between static and current electricity?

Ans: Static electricity refer to study of charges at rest, whereas current electricity refer to study of charges in motion.

3. What is an electric discharge? Under what conditions does it occur?

Ans: When negative and positive charges meet, producing streaks of bright light and sound. This process is called an electric discharge.

When the accumulation of charges between lower part of clouds and earth becomes large, it is sufficient to break the insulation of air. As a result, negative and positive charges meet and produce electric discharge.

4. In what situation can lightning be dangerous? How can the danger to tall buildings be reduced?

Ans: Lightning can be dangerous in the following situations:

- (i) When two clouds with unlike charges come near each other.
- (ii) When clouds charge tall buildings and trees by induction.

The danger to tall buildings can be reduced by placing a lightning conductor on them. If lightning strikes the building, it flows harmlessly to the earth through the conductor.

5. How does a lightning conductor work?

Ans: A lightning conductor consists of a metal rod ending in spikes at the top. The lower end of the rod is attached to a copper plate buried deep in the earth. When lightning strike the building, spikes receive charge and transfer to ground through the metal rod..

6. List four precautions you will take to save yourself from a lightning strike during a thunderstorm.

Ans: Four precautions to be taken to save myself from a lightning strike during a thunderstorm are:

- (i) Install lightning conductor on building.
- (ii) If you are in car or bus shut the windows.
- (iii) Do not take shelter under a tree
- (iv) stay away from trees and poles
- (v) If you are in an open place squat low on the ground.

7. What is the Richter scale? Why do we say that it is not a linear scale?

Ans: An instrument used to measure the magnitude or intensity of an earthquake is called Richter scale.

The number indicating the magnitude or intensity on Richter scale ranges between 0 and 9.

The Richter scale is not a linear scale because on this scale, the vibrations of an earthquake with a magnitude of 2 are 10 times greater in amplitude than those of an earthquake with a magnitude of 1.

8. List three effects of an earthquake.

Ans: The effects of earthquakes include deformation of ground surface, damage and destruction of human-made structures, towns and cities, loss of life, violent devastating fires, landslides, floods, etc.

### **E.LONG ANSWER QUESTIONS: Answer in about 60 words.**

1. Draw a labelled diagram of a gold-leaf electroscope. Describe how you will use it to detect a charge, measure a charge, and find the nature of the charge.

Ans: The gold-leaf electroscope consists of a metal disc to which a metal rod is attached. The metal rod passes into a bell jar through a tightly-fitted rubber stopper.

At the bottom of the metal rod are mounted two thin strips (or leaves) of metal. These can be made of copper, brass or gold. The bell jar rests on a wooden base. Tin foil is attached to the sides of the bell jar. The gold-leaf electroscope is used to detect and measure charge. The amount of divergence of the leaves is a measure of the amount of charge on the body.

To test whether a body has a positive or negative charge, at first we charge the electroscope with a known charge.

If the divergence of the leaves increases, the body has a similar charge.

If the divergence of the leaves decreases the body has opposite charge, i.e. it is positively charged.

2. Explain how lightning occurs between two clouds during a storm.

Ans: When two clouds with unlike charges come near each other, there can be a very heavy discharge between them. Huge amount of energy is released in the form of heat, light and sound during such a discharge. This is the lightning we see and the thunder we hear during a storm.

3. Explain the process of lightning striking a building or tree.

Ans: Clouds can charge tall buildings and trees by induction. The buildings and trees thus acquire the opposite charge. If the build up of charge is very heavy, easily flow from cloud to tree or building.

This can be very dangerous and can result in the building or the tree catching fire because of the huge amount of energy released.

4. In what ways is lightning useful?

Ans: Lightning is also useful in many ways:

(i) The heat and light released during lightning combine nitrogen of the air to oxygen to form nitrogen oxides.

When rain occurs nitrogen oxides dissolved in water and form dilute nitric acid, which comes down with rain. The Rhizobium bacteria present in root of plants convert it into nitrogenous compounds, which are essential for growth of plants.

(ii) Lightning also enables ozone to be formed from oxygen. The ozone present in air stops the harmful ultraviolet rays of the sun from reaching us.

5. Explain how an earthquake occurs.

Ans: The crust part of earth is fragmented into many pieces called tectonic plates. These plates float over the hot magma below, and are therefore in relative motion to each other. As the plate moves collide, moves apart or slide over one another cause vibration that reach over surface of the earth and felt as earthquake.

6. List three things you will do during an earthquake.

Ans: The following are some steps you should take if you are caught in an earthquake:

(i) If trapped in your home or a building, take shelter under a table and do not move till the shaking stops. Protect your head with your arms. Avoid using a lift. (ii) Do not stay near the windows, bookcases, mirrors, hanging pots, fans.

(iii) Leave your home or school building and move to open areas.

(iv) If outdoors, keep away from high-rise buildings, trees, signboards, poles and electric poles and electric wires. (v) Do not sit inside a car or a bus.

### F.HOTS QUESTIONS: Think and answer.

1. Why are taller buildings in greater danger of being struck by lightning?

Ans: Taller buildings are in greater danger of being struck by lightning because they are closer to clouds.

2. When a positively-charged body is brought near an uncharged metal rod, the part of the rod near the charged body acquires a negative charge, and the far side a positive charge: Can you say why this happens? Remember that in a body, negative charges are mobile whereas positive charges are fixed.

Ans: When a positively charged body is brought near one end of an uncharged metal rod, the negatively charged free electrons in the metal rod are attracted to the positively charged body and gather at that end of the rod. Thus the near end of the rod becomes negatively charged due to excess of electrons. The far end becomes positively charged due to deficit of electrons.

3. If you hold a plastic comb in your hand and rub it in your hair, it will get charged. However, if you do the same with a metal comb it will not get charged. Why? But if the metal comb has a plastic handle and you hold it from the handle, it will also get charged. Why?

Ans: Both plastic and metal comb will get charged when rubbed in the hair. However, since metal is a conductor, the charges will flow to earth through the body and it will lose its charge. If the metal comb has an insulating plastic handle it will retain its charge.

4. Why do you think charging by rubbing happens best in dry weather?

Ans: In humid conditions, when air holds a lot of moisture, it becomes conducting and the charges leak into the air. This does not happen in dry weather. Therefore charging by rubbing happens best in dry weather.

5. The rod of a lightning conductor accidentally broke into two from the middle. What danger will this pose if lightning strikes the building? Why?

Ans: The building will be damaged and may even catch fire as the charges will flow through the building instead of directly to the earth through the conductor.

6. Define: hypocenter, epicenter, Seismic waves

Ans: The place below earth surface from where the earthquake originates is called the **hypocenter** or the **focus** of an earthquake. It is often several kilometers below the earth's surface.

The spot on the earth's surface exactly above the hypocenter of an earthquake is the **epicenter**.

The collision of plates gives rise to vibration of earth surface called **Seismic waves** this through the earth.