

# CLASS – 8 PHYSICS CHAPTER – 8 ELECTRICITY

## EXERCISE SOLUTIONS

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### Test Your Understanding [Page No. 132]

**Question :** State whether True or False.

**1. Electricity is a form of energy.**

**Answer :** True

**2. Outermost electrons of the atoms are regarded as free electrons.**

**Answer :** True

**3. Electricity is categorized into five different groups.**

**Answer :** False

**4. The electricity supply wires at homes are colour coded having black, red and white colours, respectively.**

**Answer :** False

**5. We follow parallel connection of appliances at homes.**

**Answer :** True

**6. Nowadays, we use fuse as a safety device.**

**Answer :** True

### EXERCISES

#### A. Choose the correct option :

**1. The study of charges at rest is called :**

**Answer :** (c) static electricity

**2. An electroscope cannot be used :**

**Answer :** (d) To save the building against lightning

**3. When an ebonite rod is rubbed with a piece of woollen cloth, the rod.**

**Answer :** (d) becomes negatively charged while the cloth has a positive charge

**4. According to the laws of electrostatics :**

**Answer :** (c) A negative charge will attract positive charge

**5. Some of the safety devices used at home to safeguard our electrical appliances are :**

**Answer :** (d) all the these

**6. Which of the following is a good conductor of electricity?**

**Answer :** (c) silver

**7. Normally an atom is**

**Answer :** (c) neutral

**8. The flow of electrons in wires and appliances is known as**

**Answer :** (a) electric current

**9. Which of the following is an insulator?**

**Answer :** (b) glass

**10. When two bodies carrying same charge are brought nearer, they will show**

**Answer :** (b) repulsion

**11. This device or arrangement is used to save high buildings from lightning.**

**Answer :** (b) lightning conductor

#### B. Fill in the blanks :

**1. Charging a neutral object by touching it is called charging by.....**

**Answer :** conduction

**2. ....electricity is the electricity produced by friction.**

**Answer :** static

**3. Conventionally, the direction of current is always taken as opposite to the direction of the flow of.....**

**Answer :** electrons

**4. Lightning during the thunderstorm is caused due to electrical.....in clouds.**

**Answer :** charge

**5. A.....is produced by rubbing objects together.**

**Answer :** static electricity/static charge

**6. Electric.....is dangerous and can result in loss of life too.**

Answer : shock

7. ....is used in different devices such as mobile, car and calculators.

Answer : Battery

8. ....are used to safeguard tall buildings from lightning.

Answer : lightning conductor

9. Electric.....are made of conductive materials.

Answer : wires

10. An electric.....is a safety device installed to safeguard electrical appliances.

Answer : fuse

### C. Write T for True and F for False statements.

1. Electricity is a form of energy.

Answer : True

2. There are an equal number of protons and neutrons in an atom.

Answer : False

3. Glass is a good conductor of electricity.

Answer : False

4. Mini circuit breakers (MCBs) are not preferred in household wiring.

Answer : False

5. When a body is charged by conduction, it acquires charge of the opposite nature.

Answer : False

6. The direction of flow of the electrons in opposite to that of the flow of current.

Answer : True

7. The leaves of a Gold leaf electroscope are made of copper.

Answer : False

8. All the electrical appliances are connected in line in our household.

Answer : False

9. Materials that allow electric charge to pass through them are insulators.

Answer : False

### D. Match the following :

1. Electricity	a. Protect building and human life
2. Like charges	b. Attract each other
3. An atom	C. Some conductor
4. Unlike charges	d. Examples of insulators
5. Plastic and glass rod	e. To detect the presence of charge
6. Lightning conductor	f. Flow of electrons
7. An electroscope	g. Normally, electrically neutral
8. Iron, copper and silver	h. Repel each other

Answer : 1 – (f), 2 – (h), 3 – (g), 4 – (b), 5 – (d), 6 – (a), 7 – (e), 8 – (c)

### E. Answer the following questions in short.

1. Why is it that when you comb your dry hair, it attracts pieces of paper?

Answer : Plastic comb gets electrically charged due to rubbing & therefore it attracts tiny pieces of paper.

2. An atom is electrically neutral. Why?

Answer : The amount of charge on a single proton is equal to the amount of charge possessed by a single electron. A proton and an electron have an equal amount but an opposite type of charge. Thus, if an atom contains equal numbers of protons and electrons, the atom is described as being electrically neutral.

3. Why are there two metallic plates attached to the bell jar of an electroscope?

Answer : They increase the sensitivity of the electroscope by taking away any charge leakage from the glass jar.

4. Why electrical appliances in our household are not connected in series?

Answer : Electrical appliances are not connected in series because current will be same through all the appliances connected but voltage increases if more no. If

the battery has low voltage than the total voltage it may short circuit and damage all .

### 5. What is static electricity?

**Answer :** The phenomenon related to electric charges at rest and their properties and interaction with each other.

### 6. What do you understand by a battery?

**Answer :** A cell or battery is a common source of electric current to run a number of devices in our everyday life. For example, electric cells are used in torches, radios, T.V. remote controls, electric clocks and watches, toys, etc.

### 7. Explain conduction.

**Answer :** Conduction is defined as, when a charged body is in direct contact with an uncharged body, so that transfer of charge can take place. The total charge on the charged object gets equally distributed between the two objects in contact and the uncharged body acquires a similar charge to that of the charged body.

### 8. Write about the process of induction.

**Answer :** An uncharged body has same number of positively and negatively charged particles in it. When a charged object is brought near an uncharged object, the charge on the charged object will attract the opposite charge on the uncharged object. This causes attraction between the charged and uncharged objects. And finally charging takes place without actually touching the object with another charged object.

### 9. What is an electroscope?

**Answer :** Electroscope is an device which is used to detect the presence of a charged object.

### 10. Why do we install lightning devices on the top of tall buildings?

**Answer :** Lightning conductors are arranged at the top of buildings because the charge always tries to follow the easiest path to the earth and lightning conductors form an easy path to ground. Answer: There is lightning conductor on the top of the roof for

the protection of the building from the damage by lightning.

## F. Answer the following questions in detail.

### 1. What is static electricity and how is it produced?

**Answer : Static electricity :** The phenomenon related to electric charges at rest and their properties and interaction with each other. Static electricity is produced by rubbing objects together.

**For example :** A plastic or rubber comb when rubbed on dry hairs attracts the paper pieces because here static charge or static electricity is produced in the comb by rubbing it with hairs.

### 2. Explain the conduction and induction process of charging.

**Answer : Conduction :** Conduction is defined as, when a charged body is in direct contact with an uncharged body, so that transfer of charge can take place. The total charge on the charged object gets equally distributed between the two objects in contact and the uncharged body acquires a similar charge to that of the charged body.

**Induction :** An uncharged body has same number of positively and negatively charged particles in it. When a charged object is brought near an uncharged object, the charge on the charged object will attract the opposite charge on the uncharged object. This causes attraction between the charged and uncharged objects. And finally charging takes place without actually touching the object with another charged object.

### 3. State and explain the laws of electrostatic attraction and repulsion using an activity.

**Answer : Activity 1 :** Take two rubber balloons and inflate them. Hang the two inflated balloons with long threads in such a way that though they are close by but they do not touch each other. Rub both the balloons with a woollen cloth and release them. We will see that the two balloons move apart as if they are pushing away each other (or repelling each other). In this activity, we have brought close together two balloons which are made of the same material (rubber) and rubbed

them with the same material (woollen cloth), so the two balloons must have acquired the same type of electric charges or similar electric charges. Since two similarly charged balloons repel each other, we conclude that similar charges repel each other. The same type of electric charges or similar electric charges are also called like electric charges. So, we can also say that like charges repel. Actually, when the two balloons are rubbed with a woollen cloth, they acquire negative electric charges. The two negatively charged balloons hung near each other exert a force of repulsion on each other and hence move apart (away from each other).

**Activity 2 :** Rub a ballpoint pen refill with polythene and place this charged refill in a beaker as before. Take a balloon and also charge it by rubbing with a piece of woollen cloth. Now, hold the charged balloon in your hand and bring its charged end near the charged refill moves towards the charged balloon as if it is being attracted by the charged balloon. In this case the ballpen refill and balloon are made of two different materials (acrylic and rubber), and they have been rubbed with different materials (polythene and woollen cloth), so their electric charges must be different (or unlike). Now, since a charged balloon and a charged ballpen refill having unlike charges (or different charges) attract each other, we conclude that unlike charges attract each other. Unlike charges are also called opposite charges, so we can also say that opposite charges attract each other. Actually, when a balloon is rubbed with a woollen cloth, it acquires a negative charge and when a ballpen refill is rubbed with polythene, it gets a positive charge. So, in this case, the negatively charged balloon attracts a positively charged ballpen refill.

#### **4. What is an electroscope? Explain the construction of a gold leaf electroscope.**

**Answer :** The electroscope is a device for detecting electric charge on an object. Electroscopes are of two types : pith ball electroscope and gold-leaf electroscope.  
**Gold-leaf Electroscope :**

#### **5. Explain the working of lightning conductor.**

**Answer :** Lightning conductor is a device used to protect a building from the effects of lightning. The tall buildings (and other tall structures) are protected from lightning strikes by using a device called lightning conductor.

If lightning strikes, it will hit the top of the lightning conductor rather than the building. The electric energy of lightning passes through the metal strip and gets discharged safely into the ground through the buried metal plate. Since no electric energy produced by lightning passes through the building, no damage is caused to it. Thus, lightning can be discharged harmlessly into the ground (or earth) through the lightning conductor fitted on tall buildings. We know that metals are good conductors of electric charges (or electricity). So, a lightning conductor made of a metal works by conducting the electric energy of lightning into the earth.

#### **6. Describe safety rules for electricity.**

**Answer : Safety Rules for using Electricity :**

- (i)** Always use good quality electric wires, switches and sockets at homes and offices.
- (ii)** Use fuses or MCBs in all electric circuits.
- (iii)** Make sure that no part of your body ever comes in direct contact with an electric wire.
- (iv)** Never touch switches and sockets with wet hands.
- (v)** use three-pin plugs. They have an earth wire connection to save human bodies from electric shock.
- (vi)** Plugs must be properly inserted in their sockets to avoid sparking.
- (vii)** Ask electrician to repair faults in main electric line.

#### **7. Why do we need safety devices at home?**

**Explain the functioning of some of the safety devices.**

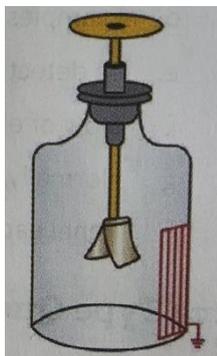
**Answer :** Every electrical appliance needs particular electricity supply. If the amount of current passing through any of the devices exceeds the permissible limit, there are chances of a short circuit which can lead to electric fires and can damage all the electrical appliances. To protect our devices and

household against such damages, we use safety devices.

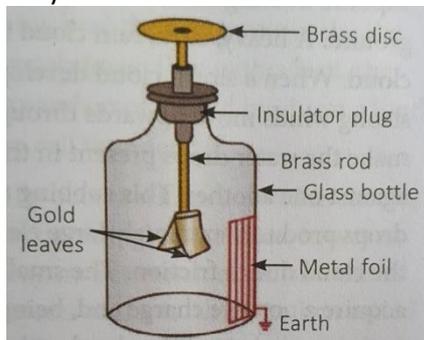
**Electric Fuse (or Fuse) :** A fuse is a safety device which prevents electric fires and damage to electrical appliances due to excessive flow of current. The fuse for protecting our household electric wiring is fitted just near the main switch on the switch board. A fuse works on the heating effect of current.

### Picture-Based Questions

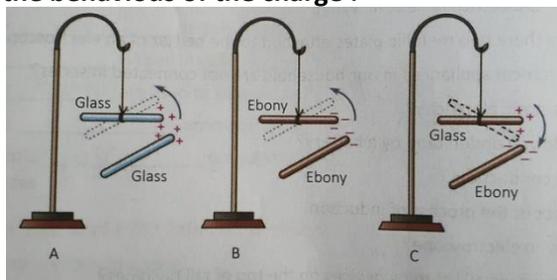
1. Look at the picture shown below and label it. Also write about the person who invented this device.



**Answer :** The gold-leaf electroscope invented in 1786 by Abraham Bennet.



2. Study the pictures 'A', 'B' and 'C' given below and describe the tests being made on the behaviour of the charge :



(a) In the case of 'A' the two glass rods .....each other because both the rods bear.....charge on them.

(b) In the case of 'B' the two ebony rods .....each other because both the rods bear.....charge on them.

(c) In the case of 'C' the two rods (glass and ebony).....each other because they bear.....charges on them.

**Answer :** (a) repel, like

(b) repel, like

(c) attract, unlike

### Application-Based Questions

1. Why are insulators used as covering for electric wires?

**Answer :** The rubber or plastic on an electrical cord provides an insulator for the wires. By covering the wires, the electricity cannot go through the rubber and is forced to follow the path on the aluminum or copper wires.

2. What is the function of neutral wire in a circuit?

**Answer :** Neutral is a circuit conductor that normally completes the circuit back to the source. Neutral is usually connected to ground (earth) at the main electrical panel, street drop, or meter, and also at the final step-down transformer of the supply.

3. Why are domestic wire systems colour coded?

**Answer :** However, color coding is used in virtually every electrical and electronic device made today, simply to allow a quick and positive identification of each wire providing positive assurance that the circuits can be connected accurately each and every time.

4. How is static electricity different from current electricity?

**Answer :** Current electricity is the form of electricity which makes all of our electronic gizmos possible. This form of electricity exists when charges are able to constantly flow. As opposed to static electricity where charges gather and remain at rest, current electricity is dynamic, charges are always on the move.