

## Science Mission 1 8 Chp15 Some Natural Phenomena solution

### ANSWERS TO TEXTBOOK QUESTIONS

#### Objective Questions

##### A. Multiple choice questions.

1. a                      2. a                      3. c                      4. c                      5. b

##### B. State whether 'true' or 'false'.

1. False                2. True                3. False                4. True                5. True  
 6. False                7. True                8. False                9. True                10. True  
 11. False               12. False              13. True                14. False              15. True

##### C. Give one word answers.

1. Lightning          2. Thunder          3. Positive            4. Negative          5. Like charges  
 6. Amber              7. Ebonite            8. Electroscope      9. Focus              10. Epicentre

##### D. Study the pictures 'A' 'B' and 'C' given below and describe the tests being made on the behavior of the charge:

1. Repel, positive                      2. Repel, negative                      3. Attract, unlike

#### Theoretical Questions

##### A. Short answer type questions.

- Dry hair when combed with a plastic comb develop a charge on them, each hair bearing the same charge and so they repel each other and they stand on.
- (a) Ebonite rod acquires negative charge when rubbed with a piece of fur.  
 (b) Fur acquires positive charge on it when ebonite is rubbed with it.  
 (c) Glas rod acquires positive charge when rubbed with a piece of silk.  
 (d) It acquires negative charge.
- Unlike charges will attract where as like charges will repel. If they repel each other than the charge on both is the same and if they attract one another than the charge on one is positive and on the other is negative. You can test the nature of the charge with the help of a charged ebonite rod.
- Positive charge. When the thermocol ball is faced with the negatively charged ebonite rod positive charge on the ball comes on the side facing the charged ebonite rod. Negative charge on the ball moves to the backside which is earthed when touched leaving behind only the positive charge on the ball.
- (a) No change since metallic rod or any other conductor of electricity will not bear any charge on it when rubbed with any soft material.  
 (b) Negative charge will develop on ebonite rod which will be transferred to both the foils on electroscope. Both foils bearing similar charge will repel each other.  
 (c) The foils will lose the charge on them and without any charge on them they will hang parallel to each other.
- To relieve or remove the charge from an object. This can be done by touching them with your finger or any part of your body. The charge, may be positive and negative is passed through a living body standing on earth barefooted. This is called earthing of a charge.
- The transfer of charge from a charged body to the earth through any conducting material is called 'Earthing'.
- It produces spark. Spark is the jumping charge.
- The strength or the magnitude of an earthquake is measured on a graph on the scale from 1 to 10. This scale is termed as Richter's scale.
- The upper tip of the lightning conductor is specially given sharp pointed shape since the pointed end of the lightning conductor cannot hold a big charge for long and the charge reaching it from the earth begins to leak into the cloud slowly and slowly, thus, neutralizing the charge in the cloud without

producing a spark.

11. Huts made from hay and mud are safer because of the hay being non-conductor. Mortar though includes metallic fixtures is not so safe to lightning but are safer to fire from lightning.

### B. Long answer type questions.

1. The kind of charge on the plastic comb or any other body when rubbed is called 'Static Electric Charge' or the 'charge at rest' (Static means which does not move and remains at rest). This results due to imbalance of electric charges within or on the surface of a material.  
Whereas in case of current electricity charge is moving in the form of electrons on conductor across the circuit.
2. When we wear a polyester shirt it develops an opposite static electric charge on it while rubbing with the body. When take off the polyester shirt the electrical charge, jumps from the shirt to the body producing a spark and the crackling sound between the body and the cloth of the shirt.
3. When two patches of cloud bearing different charges come face to face they get attracted to one another and the negative charge (electrons) jump to the positively charged cloud. The jumping of electrons (-ve charge) to the cloud bearing positive (+ve) charge and neutralizing themselves result in a big spark. The heat from the spark results in sudden expansion of air around the cloud setting the air in violent waves of sound. The light from the spark is seen by us as lightning and sound is heard as a thunder.
4. To detect the presence of a charge on a body we make use of an apparatus called electroscope. The electroscope shows the presence of a charge on a body (may be positive (+ve) or negative (-ve)) which is brought in contact with the knob on the nail. In some of the laboratories a highly sensitive 'Gold leaf electroscope' with leaves made from thin gold foils instead of aluminium foil may be available. You can make an electroscope by yourself with the use of easily available material. See activity 4 on page 212 of the textbook.
5. Scientifically, earthquake is noticed, detected and its strength is measured by a sensitive instrument called Seismograph. (Seismosis a Greek word meaning earthquake). The strength or the magnitude of an earthquake is measured on a graph on the scale from 1 to 10. The scale was proposed by an American scientist, Charles Francis Richter (1900–1985) and hence, named after him as Richter's scale. Earthquake measuring up to 4 on Richter scale is somewhat less damaging, the one measuring between 5 and 6 is dangerous and the one measuring 7 and above is disastrous.
6.
  - i. Charging by friction: There are many examples of different objects (or bodies) which develop electric charge on them when rubbed with a piece of wool, silk or cotton cloth. A glass rod when rubbed with a piece of silk develops positive electric charge on it. This is Charging by friction between the piece of silk and the glass.
  - ii. Charging by touch: When you rub glass rod to a silk, glass loses electrons and becomes positively charged. Silk gains electrons and becomes negatively charged. On touching the knob on the electroscope with the charged glass rod the gold leaves on the electroscope get charges with the same charge and divulge to show that they have acquired the charge from the glass rod by touch.
  - iii. Charging by induction: (see activity 3 on page 211). A neutral body bears both the charges on it. A glass rod on rubbing with a piece of silk gets positively charged. When this positively charged glass rod is brought to face a neutral pith ball, the positive charge on the glass rod induces negative charge in the pith ball to face the glass rod. At the same time positive charge on the ball is shifted to the opposite side. On touching the back of the ball the positive charge is earthed leaving behind only the negative charge on the ball. On removing the glass rod facing the ball, the ball is left with negative charge on it. This is charging by induction.  
To charge the pith ball with positive charge a negatively charged ebonite rod may be used.

## 7. Protection Against Earthquakes

### (a) **Precautionary safety measures to be taken before an earthquake:**

- Buildings should be so designed that they are capable of withstanding major tremors. Quake safe buildings are being designed by Architects and Structural Engineers. These buildings are based on foundation on rollers and are made with light fireproof wood and plastic instead of heavy construction material.
- Fire accident is common whenever there is an earthquake, hence fire-fighting equipment should remain at hand.
- It is better to have cupboards and shelves fixed within the wall and wall-clocks, mirrors and other fixtures properly fixed so that they may not fall on the people living in the house.

### (b) **Precautionary measures to be taken when earthquake occurs and you are at Home**

If there is a slight indication of the coming earthquake from rumblings and shaking of the earth:

- Take shelter under a table or a heavy bed keeping a thick wrap of cloth on head and stay there till the risk of earthquake is over.
- Stay away from big and heavy equipment like fridge, air conditioner, steel almirah and other heavy fixtures that may fall on you.
- If there is rumbling at night and you are in bed you may move under the bed and cover your head with a pillow, taking care that you can breathe freely.

### (c) **Precaution to be Taken if you are Out of Your Home While There is Rumbling**

- Move to an open place, away from tall buildings, trees, poles and bridges.
- Do not travel in any vehicle. Better leave the vehicle on a side, move away from the vehicle and stay in an open place.

### (d) **If you get Trapped in a Collapsed Building**

- Try to remove the dust around your nose, may be by blowing if your hands are not free and try to get regular supply of air for breathing.
- Try to make your presence known to the rescuers by tapping or moaning.
- Breathe and save your energy for shouting or doing whatever possible to make the rescuers aware of your presence when you feel that they are near about.

### (e) **Rescue operations**

- Call for fire brigade and the police to the site where damage has been caused due to earthquake.
  - Shift the injured to hospital with the help of people and the medical team, if any after giving them first aid.
  - Try rescuing people under debris to the extent you can.
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