



SCIENCE

8

Based on the New Syllabus for 2019-2020



TERM - II



M.G. RAYMOND, M.Sc., B.Ed.,

I. VIJAYA CLARA, B.Sc., B.Ed., BT. Asst.

Neyveli.



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No. 1, Sugar Mill Colony,
 Salai Kumaran illam,
 Madurai Road,

Tirunelveli - 627001.

Phone : 0462 - 233 8899 / 233 8484

Mobile : 94431 58484 / 95978 39822

Email : suryaguides@yahoo.com

New No. 59, 4th Avenue,
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 Ashok Nagar,

Chennai - 600 083.

Phone : 044 - 2474 4484

Mobile : 94421 58484 / 94425 58484

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PREFACE

SCIENCE text books have been prepared following the guidelines given in the **NATIONAL CURRICULUM FRAME WORK**. The new text books provide ample opportunities for the children to learn the language and use it effectively and effortlessly. The marked changes in the new books aim at equipping the children with a gradual building of language competency.

In tune with the objectives as formulated in the new text books, **SURYA PUBLICATION** has come out with a new work book and guide to facilitate the children to learn at ease and score very good marks in their language papers. Every effort has been taken to make the exercises easy to attempt. With answers in a simple language, additional exercises have been given to hone the linguistic skills of the children.

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Wish you the most successful, pleasant Academic year with **SURYA GUIDE**.

-Publisher



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Unit

1

PHYSICS

Heat



TEXT BOOK EXERCISES

I. Choose the best answer.

1. Heat is a form of _____.
a) electrical energy b) gravitational energy
c) thermal energy d) none of these **[Ans: c) thermal energy]**
2. If you apply some heat energy to a substance, which of the following can take place in it?
a) Expansion b) Increase in temperature
c) Change of state d) All the above **[Ans: d) All the above]**
3. Which of the following substances will absorb more heat energy?
a) Solid b) Liquid
c) Gas d) All the above **[Ans: a) Solid]**
4. If you apply equal amount of heat to a solid, liquid and gas individually, which of the following will have more expansion?
a) Solid b) Liquid
c) Gas d) All of them **[Ans: c) Gas]**
5. The process of converting a liquid into a solid is called _____.
a) sublimation b) condensation
c) freezing d) deposition **[Ans: c) freezing]**
6. Conduction is the heat transfer which takes place in a _____.
a) solid b) liquid
c) gas d) all of them **[Ans: a) solid]**

II. Fill in the blanks.

1. A calorimeter is a device used to measure the _____.
[Ans: heat capacity of water]
2. _____ is defined as the amount of heat required to raise the temperature of 1 kg of a substance by 1°C.
[Ans: specific heat capacity]





3. A thermostat is a device which maintains _____. **[Ans: sensing]**
4. The process of converting a substance from gas to solid is called _____.
[Ans: deposition]
5. If you apply heat energy, the temperature of a system will _____.
[Ans: increase]
6. If the temperature of a liquid in a container is decreased, then the interatomic distance will _____.
[Ans: decrease]

III. State True or False. If false, correct the statement.

1. The applied heat energy can be realized as an increase in the average kinetic energy of the molecules.
True
2. The dimensions of a substance are increased if the temperature of the substance is decreased.
False
Correct Statement: The dimensions of a substance are increased if the temperature of the substance is increased.
3. The process of converting a substance from solid to gas is called condensation.
False
Correct Statement: The process of converting a substance from solid to gas is called sublimation.
4. Convection is the process by which the thermal energy flows in solids.
False
Correct Statement: Convection is the process by which the thermal energy flows in liquids and gases.
5. The amount of heat gained by a substance is equal to the product of its mass and latent heat.
True
6. In a thermos flask, the silvered walls reflect and radiate the heat to the outside.
False
Correct Statement: In a thermos flask, the silvered walls reflect and radiate the heat back to the liquid in the bottle.



**IV. Match the following.**

- | | | |
|-----------------|---|------------------|
| 1. Conduction | - | a) Liquid |
| 2. Convection | - | b) Gas to liquid |
| 3. Radiation | - | c) Solid to gas |
| 4. Sublimation | - | d) Gas |
| 5. Condensation | - | e) Solid |

[Ans: 1.e 2.a 3.d 4.c 5.b]**V. Read the directions given below and answer the questions.**

- If both assertion and reason are true and the reason is the correct explanation of the assertion.
- If both assertion and reason are true, but reason is not the correct explanation of the assertion.
- If the assertion is true, but the reason is false.
- If the assertion is false, but the reason is true.

- Assertion** : Radiation is a form of heat transfer which takes place only in vacuum.
Reason : The thermal energy is transferred from one part of a substance to another part without the actual movement of the atoms or molecules.

[Ans: b. Both assertion and reason are true, but reason is not the correct explanation of the assertion.]

- Assertion** : A system can be converted from one state to another state.
Reason : It takes place when the temperature of the system is constant.

[Ans: a. Both assertion and reason are true and the reason is the correct explanation of the assertion.]**VI. Answer briefly.****1. What are the applications of conduction in our daily life?**

- For cooking of food.
- For ironing of clothes.

2. What are the effects of heat?

The effects of heat are

- Expansion.
- Increase in temperature.
- Change in state.



**3. Name three types of heat transfer.**

The three ways of heat transfer are:

- Conduction
- Convection
- Radiation

4. What is conduction?

Conduction is the process of heat transfer in solids from the region of higher temperature to the region of lower temperature without the actual movement of molecules.

5. Write a note on convection.

- Heat transfer from places of high temperature to places of low temperature by the actual movement of liquid or gas molecules is called convection.
- Convection takes place in liquids and gases.

6. Define specific heat capacity.

- The amount of heat energy required to raise the temperature of 1 kg of a substance by 1°C or 1K.
- It is denoted by the symbol C .

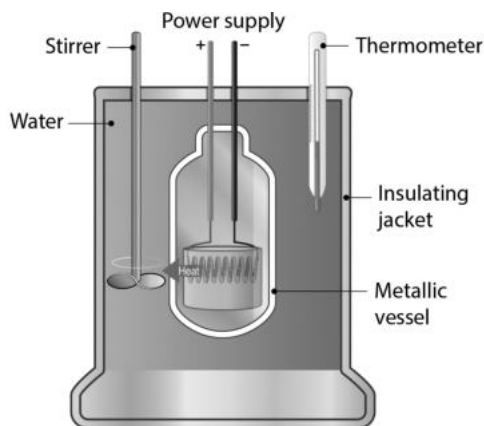
7. Define one calorie.

- One calorie is the amount of heat energy required to raise the temperature of 1 gm of water through 1°C .
- 1 Calorie = 4.186 J

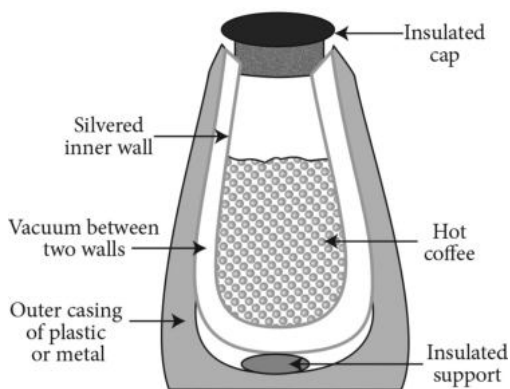
VII. Answer in detail.**1. With the help of a neat diagram explain the working of a calorimeter.**

- A calorimeter is a device used to measure the amount of heat gained or lost by a substance.
- It consists of a vessel made up of metals like copper or aluminium which are good conductors of heat and electricity.
- The metallic vessel is kept in an insulating jacket to prevent heat loss to the environment.
- There are two holes in it. Through one hole a thermometer is inserted to measure the temperature of the contents.
- A stirrer is inserted through another hole for stirring the content in the vessel.
- The vessel is filled with liquid which is heated by passing current through the heating element.
- Using this device we can measure the heat capacity of water.



*Calorimeter***2. Write a note on thermostat.**

- A thermostat is a device which maintains the temperature of a place or an object constant.
- Thermostats used in any device or system that gets heated or cools down to a pre-set temperature.
- It turns an appliance or a circuit on or off when a particular temperature is reached.
- Sometimes, a thermostat functions both as the sensor and the controller of a thermal system.
- Examples for thermostat include, building heater, central heater in a room, air conditioner, water heater, oven and refrigerators.

3. Explain the working of thermos flask.*Thermos Flask*

- A thermos flask has double walls, which are evacuated.
- It is silvered on the inside.
- The vacuum between the two walls prevents heat being transferred from the inside to the outside by conduction and convection.





- With very little air between the walls, there is almost no transfer of heat from the inner wall to the outer wall or vice versa.
- Conduction can only occur at the points where the two walls meet, at the top of the bottle and through an insulated support at the bottom.
- The silvered walls reflect radiated heat back to the liquid in the bottle.

VIII. Higher Order Thinking Questions.

- Why does the bottom of a lake not freeze in severe winter even when the surface is all frozen?**
 - When a lake freezes, the upper layer freezes due to the contact with the cold atmosphere.
 - This sheet of ice doesn't sink as it is less dense than water.
 - This ice sheet acts like an insulator, since the conductivity of ice is low, so it keeps the water inside warm enough to be in a liquid form.
 - Even though the water on the surface of a lake is frozen.
- Which one of the following statements about thermal conductivity is correct? Give reason.**
 - Steel > Wood > Water
 - Steel > Water > Wood
 - Water > Steel > Wood
 - Water > Wood > Steel

b) Steel > Water > Wood

 - Since the conductivity of steel is more than wood.
 - Steel can absorb heat more faster than water and wood.
 - The wood has the least absorption of heat.
 - Thus the order thermal conductivity is steel > water > wood.

IX. Problems.

- An iron ball requires 1000 J of heat to raise its temperature by 20°C. Calculate the heat capacity of the ball.**

Solution:

Given:

$$\begin{aligned} \text{Amount of heat energy supplied (Q)} &= 1000 \text{ J} \\ \text{Rise in temperature } \Delta t &= 20^\circ\text{C} \end{aligned}$$



$$\begin{aligned}
 \therefore \text{heat capacity 'C'} &= \frac{Q}{\Delta T} \\
 &= \frac{1000 \text{ J}}{20^\circ \text{C}} \\
 &= 50 \text{ J } ^\circ\text{C}^{-1} \text{ or } 3.141 \text{ JK}^{-1}
 \end{aligned}$$

2. The heat capacity of the vessel of mass 100 kg is 8000 J/°C. Find its specific heat capacity.

Solution:

Given:

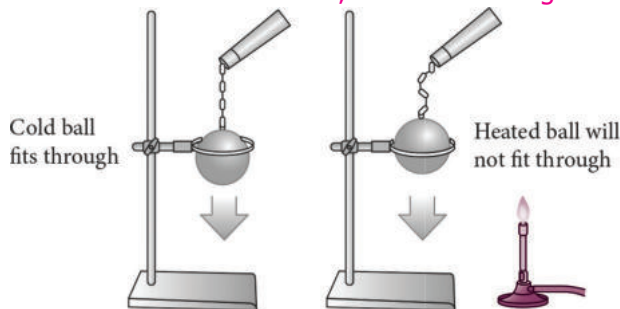
$$\begin{aligned}
 \text{Heat capacity } C' &= 8000 \text{ J/}^\circ\text{C} \\
 \text{Mass} &= 100 \text{ Kg} \\
 \text{We know that } C' &= \frac{Q}{\Delta T} \\
 &= 8000 \text{ J/}^\circ\text{C} \\
 \text{Specific heat capacity } C &= \frac{Q}{m} \times \Delta t \text{ (or)} \frac{C'}{m} \\
 &= \frac{8000 \text{ J/}^\circ\text{C}}{100 \text{ Kg}} \\
 &= 80 \text{ J Kg}^{-1} ^\circ\text{C}^{-1}
 \end{aligned}$$

Activity

1

B.P.No.1

Take a metal ball and a metal ring of suitable diameter. Pass the metal ball through the ring. You can observe that the metal ball can easily go through it. Now heat the metal ball and then try to pass it through the ring. It will not pass through the ring. Keep the metal ball on the ring for some time. In few minutes, it will fall through the ring.



When the ball was heated, it expanded. So it did not go into the ring. But when it is cooled, the ball came back to the original size. So it went into the ring easily. Thus we can say that, solids expand on heating and contract on cooling.



**Activity****2**

B.P.No.2

Take a cup of water and note its temperature. Heat the water for few minutes and note the temperature again. Do you find any increase in the temperature? What caused the temperature change?

- Yes, there is an increase in the temperature of the water.
- The heat energy supplied to the water, increase the kinetic energy of the molecules.

Activity**3**

B.P.No.3

Take few ice cubes in a container and heat them for some time. What happens? The ice cubes melt and become water. Now heat the water for some time. What do you observe? The volume of water in the vessel decreases. What do you understand from this activity?

From this activity we understand that, heat energy causes change in the state of the substance.

Activity**4**

B.P.No.3

Take hot water in a cup and put a silver spoon in it. Leave the spoon inside the water for some time. Now touch the end of the spoon. Do you feel the heat?

Yes, the end of the spoon is hot, because heat in the hot water is transferred from one end to other end of the spoon.

Activity**5**

B.P.No.4

Take some water in a vessel and heat it on a stove. Touch the surface of the water. It will be cold. Touch it after some time. It will be hot now. How did the heat which was supplied at the bottom reach the top?

When the water in the vessel is heated, water molecules at the bottom receive heat energy and move upward.

ADDITIONAL QUESTIONS

1. A cup of hot tea on a metal table in a room loses heat by _____.

- | | |
|---------------|------------------|
| a) conduction | b) convection |
| c) radiation | d) all the above |
- [Ans: d) all the above]**

2. What would happen to a hole in a metal sheet when the sheet is heated?

- | | |
|-------------------------|---------------------------------------|
| a) it decreases in size | b) it increases in size |
| c) no change in seen | d) first increases and then decreases |

[Ans: b) it increases in size]

**3. Which of the following is equivalent of a calorie?**

- a) the specific heat of water
- b) the energy needed to increase the temperature of 1 gm of water 1°C
- c) equivalent to a little over 4 J of mechanical work
- d) all of the above

[Ans: d) all of the above]**4. In which of the following process of heat transfer, no medium is required?**

- a) conduction
- b) convection
- c) radiation
- d) all the above

[Ans: c) radiation]**5. In which of the following process, is heat is transferred directly from molecule to molecule?**

- a) conduction
- b) convection
- c) radiation
- d) all the above

[Ans: a) conduction]**6. The surface which radiates more heat at a given temperature is _____.**

- a) black and polished
- b) white and polished
- c) white and rough
- d) black and rough

[Ans: b) white and polished]**7. When a solid, liquid or a gas changes from one physical state to another, the change is called _____.**

- a) melting
- b) enthalpy
- c) a phase change
- d) sublimation

[Ans: c) a phase change]**8. A cooking pot is coated black because _____.**

- a) black substance absorbs more heat
- b) black substance reflects more heat
- c) black substance are easier to clean
- d) the material of the pot would not be damaged

[Ans: a) black substance absorbs more heat]**9. How will a metal container full of hot water in vacuum lose heat?**

- a) by conduction
- b) by convection
- c) by radiation
- d) will stay hot forever

[Ans: c) by radiation]**10. Compared to warm air, cool air can hold**

- a) more water vapour
- b) less water vapour
- c) the same amount of water vapour
- d) temperature is not needed

[Ans: b) less water vapour]

**II. Fill in the blanks.**

- When a solid substance on heating changes to liquid, this process is called _____.
[Ans: melting]
- The only matter on the earth that can be found naturally in all three states is _____.
[Ans: water]
- All metals are _____ conductors of heat.
[Ans: good]
- In refrigerators, cool air moves downward and replaces the hot air because of _____.
[Ans: convection]
- Snow is a _____ conductors of leaf.
[Ans: poor]
- _____ is the process of heat transfer from one place to another in the form of electromagnetic waves.
[Ans: Radiation]
- The S.I unit of energy is _____.
[Ans: Joule]
- The technique used to measure the amount of heat involved in a physical or a chemical process is known as _____.
[Ans: calorimetry]
- _____ scale of temperature is the most common used.
[Ans: Kelvin]
- The amount of energy in the food item is measured by the unit. [Ans: kilocalorie]

III. State True or False. If false, correct the statement.

- A thermostat is a device which maintains the temperature of a place or an object constant.
[Ans: True]
- Calorimeter measures the heat capacity of all the fluids.
[Ans: False]
Correct Statement: Calorimeter measures the heat capacity of water.
- The working of thermoflask is based on the principle of conduction and convection.
[Ans: True]
- Heat capacity is the amount of heat energy required to raise the temperature of substance by 1°F .
[Ans: False]
Correct Statement: Heat capacity is the amount of heat energy required to raise the temperature of a substance by 1°C .
- Heat transfer causes only expansions in the substance.
[Ans: False]
Correct Statement: Heat transfer cause expansion, increase in temperature and changes the state of the substances.

IV. Match the following.

- | | | | |
|-------------------|---|--------------------------------|--------------------------------|
| 1. A thermostat | - | a) thermos flask | |
| 2. Dewar flask | - | b) absorbs more heat radiation | |
| 3. Black surface | - | c) liquids and gases | |
| 4. 1 Kilo calorie | - | d) sensor and controller | |
| 5. Convection | - | e) 4200 J | [Ans: 1.d 2.a 3.b 4.e 5.c] ... |

**V. Answer briefly.****1. Why is the temperature inside the igloo is warm?**

The temperature inside the igloo is warm because, snow is a poor conductor of heat.

2. What are good and bad conductors of heat?

- Substances which conduct heat are called good conductors. **Eg:** all metals.
- Substances which do not conduct or allow heat to pass through them are called bad conductors. **Eg:** wood, cork, cotton, wool, glass, rubber.

3. Why there are gaps left in the railway tracks?

- It is because railway tracks are made up of iron metal, which will expand during summer.
- When there is a gap, there will not be any damage in the track due to expansion of the metal rod.

4. Among the three forms of matter, which form of matter expand more?

Gases expand more than the liquids and solids because of their loosely arranged molecular packing. The order of expansion is gases > liquids > solids.

5. Write the different types of change of state of matter when it is heated.

Due to heat energy, the following changes occur.

- | | | |
|-------------------|---|--------------|
| ● solid to liquid | - | melting |
| ● liquid to gas | - | vaporization |
| ● solid to gas | - | sublimation |
| ● gas to liquid | - | condensation |
| ● liquid to solid | - | freezing |
| ● gas to solid | - | deposition |

6. What are the three scales to measure the temperature?

There are three scales to measure the temperature. They are,

- Celsius scale
- Fahrenheit scale
- Kelvin scale

7. On what factors does the amount of heat gained or lost by a substance determined?

The amount of heat energy gained or lost by a substance is determined by three factors.

- mass of the substance
- change in temperature of the substance
- nature of the material of the substance





8. Define - Heat capacity.

- Heat capacity is defined as the amount of heat energy required by a substance to raise its temperature by 1°C or 1K .
- It is denoted by the symbol C' .
- Heat capacity $C' = \frac{Q}{\Delta T}$

VI. Answer in detail.

1. Write the applications of conduction, convection and radiation.

Conduction:

- Cooking of food, heat is transferred by the metal to the food.
- Ironing of dress: Heat is transferred from the iron to the cloth.
- Handles of cooking utensils are made of plastic or wood because they are poor conductors of heat.

Convection:

Due to convection of air

- Land and sea breeze is formed.
- Wind flows from one region to another.
- In hot air balloons heat is transferred, as a result the balloon rises.
- In refrigerators, cool air moves downward and replaces the hot air.

Radiation:

Due to radiation,

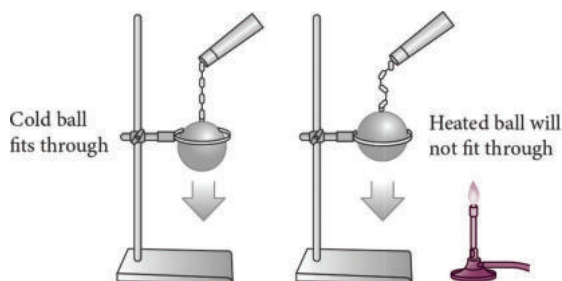
- Heat energy from the sun reaches the Earth.
- We feel the heat while standing near the fire.
- The bottom of the cooking vessels are painted black, because it can absorb heat radiation fast.
- White colour reflects heat radiation.

3. Explain the expansion of solids using ball and ring experiment.

Substances expand on heating and contract on cooling.

- A metal ring and a ball is taken.
- The diameter of the ball should be in such a way that it can just pass through the ring at room temperature.
- If the ball is heated in a flame and then placed on the ring, it does not pass through it.





- This shows that the ball has expanded.
- The expansion can be proved by passing the ball into the ring after it cools down.
- We can infer that solids expand on heating and contract on cooling.

Problems.

4. How much energy is needed to heat 9.00 g of water from 25°C to 85°C?

Solution:

Given

$$\begin{aligned}
 \text{mass of H}_2\text{O (m)} &= 9.00 \text{ g} \\
 \Delta \text{ temperature } (\Delta t) &= 85 - 25^\circ\text{C} \\
 &= 60^\circ\text{C} \\
 \text{specific heat capacity of H}_2\text{O C} &= 4.18 \text{ J g}^{-1} ^\circ\text{C}^{-1} \\
 \therefore \text{heat energy required Q} &= m \times \Delta t \times C \\
 &= 9.00 \text{ g} \times 60^\circ\text{C} \times 4.18 \text{ J/g}^\circ\text{C} \\
 \mathbf{Q} &= \mathbf{2257 \text{ J}}
 \end{aligned}$$

5. What is the SHC of a 22.8 g sample of a metal that absorbs 1450 J of heat from 21.8°C to 75.0°C?

Solution:

Given

$$\begin{aligned}
 \text{Heat energy Q} &= 1450 \text{ J} \\
 \text{mass of the metal m} &= 22.8 \text{ g} \\
 \text{change in temperature } \Delta t &= 53.2 ^\circ\text{C} \\
 \therefore \text{specific heat capacity SHC C} &= \frac{Q}{m \times \Delta T} = \frac{1450 \text{ J}}{22.8 \text{ g} \times 53.2 ^\circ\text{C}} \\
 &= \frac{1.20 \text{ J}}{\text{g}^\circ\text{C}}
 \end{aligned}$$





UNIT TEST : 1

Heat

Time: 30 mins

Marks: 25

I. Choose the correct answer.

3×1=3

1. The amount of heat gained or lost by a substance is measured using _____.

- a) thermostat b) thermos flask
c) vacuum flask d) calorimeter

2. Heat energy from the sun reaches the earth by _____ process.

- a) radiation b) convection
c) conduction d) all the above process

3. The _____ colour reflects heat radiations.

- a) black b) green
c) white d) red

II. Fill in the blanks.

4×1=4

4. The unit of energy in SI system is _____.
5. The most commonly used scale is _____.
6. The technique used to measure the amount of heat involved in a physical or a chemical process is known as _____.
7. A thermostat is a device which maintains _____.

III. Match the following.

5×1=5

- | | | |
|------------------|---|------------------------|
| 8. sublimation | - | heat capacity of water |
| 9. convection | - | insulating vessel |
| 10. condensation | - | liquids |
| 11. calorimeter | - | solid to gas |
| 12. thermosflask | - | gas to liquid |

IV. Answer briefly.

4×2=8

13. What are the effects of heat?
14. Define specific heat capacity.
15. On what factors does the amount of heat gained or lost by a substance determined.
16. An energy of 84,000 J is required to raise the temperature of 2 kg of water from 60°C to 70°C. Calculate the SHC of water.

V. Answer in detail.

1×5=5

17. With a neat diagram explain the working of a calorimeter.



Unit

2

PHYSICS

ELECTRICITY

TEXT BOOK EXERCISES

I. Choose the best answer.

1. When an ebonite rod is rubbed with fur, the charge acquired by the fur is
 - a) negative
 - b) positive
 - c) partly positive and partly negative
 - d) None of these**[Ans: b) positive]**
2. The electrification of two different bodies on rubbing is because of the transfer of
 - a) neutrons
 - b) protons
 - c) electrons
 - d) protons and neutrons**[Ans: c) electrons]**
3. Which of the following a simple circuit must have?
 - a) Energy Source, Battery, Load
 - b) Energy Source, Wire, Load
 - c) Energy Source, Wire, Switch
 - d) Battery, Wire, Switch**[Ans: d) Battery, Wire, Switch]**
4. An electroscope has been charged by induction with the help of charged glass rod. The charge on the electroscope is
 - a) negative
 - b) positive
 - c) both positive and negative
 - d) None of the above**[Ans: b) positive]**
5. Fuse is
 - a) a switch
 - b) a wire with low resistance
 - c) a wire with high resistance
 - d) a protective device for breaking an electric circuit**[Ans: d) a protective device for breaking an electric circuit]**

II. Fill in the blanks.

1. _____ takes place by rubbing objects together.
2. The body which has lost electrons becomes _____.

[Ans: charging]**[Ans: positively charged]**



3. _____ is a device that protects building from lightning strike.

[Ans: Lightning arrester]

4. _____ has a thin metallic filament that melts and breaks the connection when the circuit is overheated.

[Ans: A fuse wire]

5. Three bulbs are connected end to end from the battery. This connection is called _____.

[Ans: series circuit]

III. State True or False. If false, correct the statement.

1. The charge acquired by an ebonite rod rubbed with a piece of flannel is negative.

[Ans: True]

2. A charged body induces an opposite charge on an uncharged body when they are brought near.

[Ans: False]

Correct Statement: An uncharged body acquires an opposite charge at the near end and similar charge at the farther end.

3. Electroscope is a device used to charge a body by induction.

[Ans: True]

4. Water can conduct electricity.

[Ans: True]

5. In parallel circuit, current remains the same in all components.

[Ans: False]

Correct Statement: In parallel circuit, voltage the same in all the components but the current flowing through the circuit differs.

IV. Match the following.

- | | |
|--|--|
| 1. Two similar charges | - a) acquires a positive charge |
| 2. Two dissimilar charges | - b) prevents a circuit from overheating |
| 3. When glass rod is rubbed with silk | - c) repel each other |
| 4. When ebonite rod is rubbed with fur | - d) attract each other |
| 5. Fuse | - e) acquires a negative charge |

[Ans: 1.c 2.d 3.a 4.e 5.b]

V. Give reason for the following.

1. When a glass rod is rubbed with silk cloth both get charged.

When a glass rod is rubbed with a silk piece, the free electrons in the glass rod are transferred to silk piece. Since the glass rod loses electrons, it has a deficiency of electrons and hence acquires a positive charge, but the silk piece has excess of electrons, so it becomes negatively charged.

2. When a comb is rubbed with dry hair it attracts small bits of paper.

Comb rubbed with hair gains electrons from the hair and becomes negatively charged. These electrons are accumulated on the surface of the comb. When the bits of paper



having positive and negative charges present at the edges of the bits come in contact with comb, the negative charges in the comb attract positive charges in the bits. So the paper bits are moving towards the comb.

3. When you touch the metal disc of an electroscope with a charged glass rod the metal leaves get diverged.

When a positively charged glass rod is brought near the top knob of the electroscope, the free electrons in the electroscope start to move up towards the knob, which means the bottom has a net positive charge. Thus the leaves will spread apart again.

4. In an electroscope the connecting rod and the leaves are all metals.

Since metals are good conductors of electricity, the connecting rod and the leaves of an electroscope are all made of metals.

5. One should not use an umbrella while crossing an open field during thunderstorm.

Having an umbrella in the hands is the tallest in that area and the chances of getting hit by the lightning increases more. The rod of the umbrella is a metal and the person carrying it will get an electric shock as the current passes from the rod to the body of the person holding it.

VI. Choose the correct answer from the following directions.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If the assertion is true but reason is false.
- d) If the assertion is false but reason is true.

1. **Assertion** : People struck by lightning receive a severe electrical shock.
Reason : Lightning carries very high voltage.

[Ans: a) Both assertion and reason are true and reason is the correct explanation of assertion.]

2. **Assertion** : It is safer to stand under a tall tree during lightning.
Reason : It will make you the target for lightning.

[Ans: d) The assertion is false but reason is true.]

VII. Answer briefly.

1. How charges are produced by friction?

Rubbing certain materials with one another can cause the build-up of electrical charges on the surfaces. It is also clear that charges are transferred by friction.

2. What is earthing?

A safety measure devised to prevent people from getting shocked if the insulation inside electrical devices fails is called earthing.





3. What is an electric circuit?

The path through which electrons flow from one terminal of the battery to the another terminal of the battery is called electric circuit.

4. What is electroplating?

Electroplating is the process of depositing of layer of one metal over the surface of another metal by passing electric current.

5. Give some uses of electroplating.

Electroplating is used in many fields,

- Iron tends to corrode and rust. It is widely used to build bridges and in automobiles. So it is electroplated with zinc to protect it from corrosion and rust. This is called galvanisation.
- Steel is used for making objects like car parts, bath taps, gas burners bicycle handlebars, wheel rims. Steel is coated with chromium, to make the objects strong, durable and attractive. This electroplating is called chrom plating.

VIII. Answer in detail.

1. Explain three ways of charge transfer.

There are three methods of charging

- charging by friction
- charging by conduction
- charging by induction

Charging by friction:

When an object is rubbed with another object, the atoms in the objects get rubbed and a transfer of electrons take place between the atom of the two objects, one object loses electrons and the other gains electrons, making both the objects charged.

Charging by conduction:

An object can be charged by simply touching it by an electrically charged object. This process of charging is called charging by conduction. When a charged body is placed in contact with another body, charges get transferred to the other body and both get charged.

Charging by induction:

When a charged body is brought close to the neutral body (uncharged), the uncharged body gets opposite charge on the nearer side close to charged body and similar charge at the farther end. Thus a neutral body is charged without touching the charged body. This is called as charging by induction.





2. What is electroscope? Explain how it works?

- An electroscope is a device used to detect and measure electric charges.
- It works on the principle of transfer of charges by conduction or induction. (ie. like charges repel each other)

Structure of Electroscope:

- An electroscope is made up of metallic rod placed inside the jar.
- The upper end of the rod has a metallic knob and the lower end of the rod has thin metallic leaves hanging parallel to each other.
- The leaves are made up of gold or silver because they are good conductors of electricity.

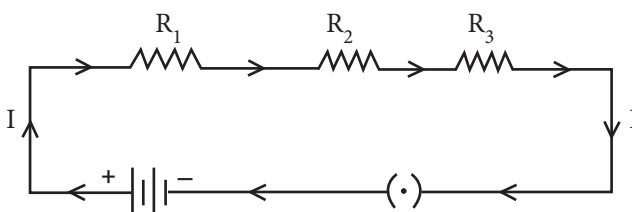
Working:

- When a charged body touches the knob of the electroscope, the charge is transferred to the knob because of conduction.
- The charge is then transferred to the gold leaves through the metal rod.
- The leaves repel each other and separate out.
- From this effect, we can check if the body carries a charge.
- We can also find the nature of the charge by charging the gold leaf by induction.

3. Explain series and parallel circuit.

a) Series circuit:

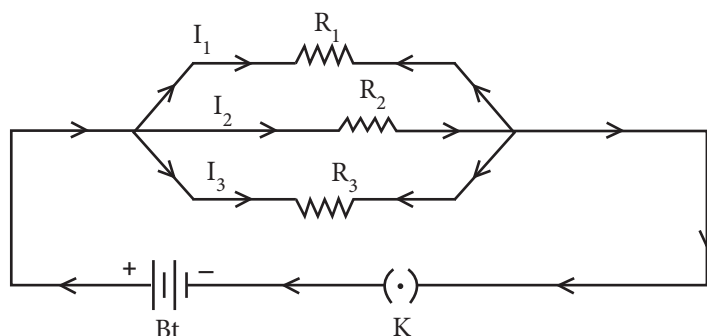
- A series circuit has more than one resistor (bulb) which are connected end to end.
- The current through the circuit remains the same throughout the circuit ie. flow of current is unidirectional.
- The voltage gets divided across the bulbs in the circuit.
- In a series circuit, the charges flow from the battery to each bulb, one at a time, in the order they are wired to the circuit.
- If one bulb in the circuit is unscrewed, the current flow to another bulb would be stopped.
- If more number of bulbs in a circuit with a battery increases, the light will be dimmer, because many bulbs are sharing the same power from the battery.





b) Parallel circuit:

- In a parallel circuit, there are more than one resistor (bulb), which are connected separately to the battery.
- The flow of current has more paths to flow.
- The voltage across the resistors remains the same but the current gets divided across each resistor.
- When one bulbs burn out, the other bulbs will work because the electricity is not flowing through one path.
- If the number of bulbs increases, the bulbs do not dim out as in series circuit because the voltage across each path is the same as in all the other path.



4. How lightning takes place?

- Lightning is an electric discharge which takes place in clouds.
- Lightning is produced by the discharges of electricity from cloud to cloud or from cloud to ground.
- During the thunderstorms, air is moving upward rapidly.
- This air carries small ice crystals as it moves upward, the ice crystals becomes positively charged.
- At the same time, small water drops move downward, becomes negatively charged as it collide with the ice crystals.
- Thus the upper part of the cloud is positively charged and lower part of the cloud is negatively charged.
- When they come into contact, the electrons in the water drops are attracted by the positive charges in the ice crystals.
- As a result, electricity is generated and lightning is seen.
- Huge quantities of electricity are discharged in lightning flashes.



5. What is electroplating? Explain how it is done.

The process of depositing a layer of one metal over the surface of another metal by passing electric current is called electroplating.

Procedure:

- Take copper sulphate solution in a beaker.
- Immerse two copper plates into the solution.
- One plate is connected to the positive end of the battery ie the anode, the other plate is connected to the negative end of the battery ie the cathode.
- When current passes through the solution, it splits up into positive Cu^{2+} ions and negative SO_4^{2-} ions.
- The positive copper ions (Cu^{2+}) move towards the cathode and gets deposited on the cathode.
- The negative sulphate ion (SO_4^{2-}) move towards the anode and reacts with copper in the anode, gets converted into copper sulphate. This process is called electroplating.

Activity

1

B.P.No.13

Take a comb and place it near some pieces of paper. Are they attracted by the comb? No. Now comb your dry hair and place it near them. What do you see? You can see that the paper pieces are attracted by the comb now. How is it possible?

Comb rubbed with hair becomes negatively charged. The paper bits will have positive and negative ends. The negative charges in the comb attracts the positive ends of the paper bits. So the paper bits are moving towards the comb.

Activity

2

B.P.No.13

Take a sheet of paper. Turn it into a hollow cylinder. Tie one end of the cylinder with a silk thread and hang it from a stand. Now take an ebonite rod and charge it by rubbing it with a woollen cloth. Bring this charged ebonite rod near the paper cylinder. The cylinder will be attracted by the rod. If you touch the paper cylinder by the charged rod, you will see the paper cylinder repelling the rod. Can you give the reason?

The ebonite rod becomes negatively charge when it is rubbed with a woollen cloth. When it is brought near the positively charged paper cylinder, it is attracted towards it. On the other hand, when the cylinder is touched by the rod, some negative charges one transferred to the paper. Hence the negative changes in the rod are repelled by the negative charges in the cylinder.



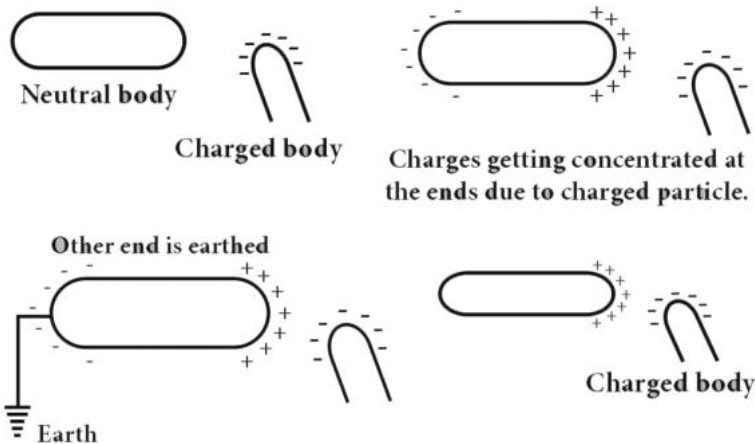


Activity

3

B.P.No.13

Bring a negatively charged plastic rod near a neutral rod. When the negatively charged plastic rod is brought close to the neutral rod, the free electrons move away due to repulsion and start piling up at the farther end. The near end becomes positively charged due to deficit of electrons. When the neutral rod is grounded, the negative charges flow to the ground. The positive charges at the near end remain held due to attractive forces and the electrons inside the metal is zero. When the rod is removed from the ground, the positive charge continues to be held at the near end. This makes the neutral rod a positively charged rod.



This method of charging a neutral body by an charged body is called charging by induction.

Activity

4

B.P.No.13

Rub your foot on a carpet floor and touch a door knob.
What do you feel? Do you feel the shock in your hand? Why does this happen?

Getting a shock from a door knob after rubbing your foot on a carpet floor, results from discharge. Discharge occurs when elections on the hand are quickly pulled to the positively charged door knob. This movement of elections is felt as a shock, causing the body to lose negative charge.



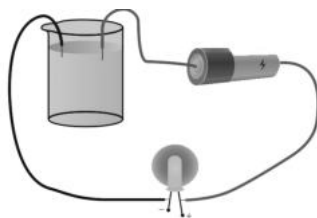
Activity

5

B.P.No.13

Take two pieces of wire, an LED light and a battery, and make a simple electric circuit. Take some water in a glass and put the wires in the water as shown in the figure. Does the LED bulb glow? What do you understand from this?





This activity shows that liquids also conduct electricity. Water acts as an electrolyte and allows electric current to pass through it. Thus the LED bulb glows. This process is called electrolysis.

ADDITIONAL QUESTIONS

I. Choose the best answer.

1. The property of material due to which it attracts or repels other objects is

- a) friction
 - b) velocity
 - c) current
 - d) charge
- [Ans: d) charge]

2. Plastic rod rubbed with fur and glass rod rubbed with silk.

- a) repel each other
- b) mix up with each other
- c) attract each other
- d) none of the above

[Ans: c) attract each other]

3. A negative charge

- a) repels neutral charge
- b) attracts neutral charge
- c) repels negative charge
- d) repel positive charge

[Ans: c) repels negative charge]

4. Electric charge between two bodies can be produced by _____.

- a) striking
 - b) rubbing
 - c) oiling
 - d) passing
- [Ans: b) rubbing]

5. The attraction or repulsion between electric charges is _____.

- a) electric force
 - b) conduction
 - c) friction
 - d) electric field
- [Ans: a) electric force]

6. During charging _____ are transferred from one object to another.

- a) protons
 - b) neutrons
 - c) electrons
 - d) none of these
- [Ans: c) electrons]

7. Lightning occurs due to _____ between the clouds.

- a) collision
 - b) electric discharge
 - c) thunder
 - d) dust
- [Ans: b) electric discharge]





[Ans: b) resistance]

[Ans: a) electrolysis]

[Ans: c) earthing]

[Ans: chemical change]

[Ans: True]





3. The ebonite rod becomes positively charged when rubbed with woollen cloth.

[Ans: False]

Correct Statement: The ebonite rod becomes negatively charged when rubbed with woollen cloth.

4. Movement of electrons in a material constitutes electric current.
5. Atoms are made up of particles like protons, electrons and neutrons.

[Ans: True]

[Ans: True]

IV. Match the following.

- | | | |
|-------------------------|---|---------------------------|
| 1. Copper sulphate | - | a) transfer of charges |
| 2. Lightning arrester | - | b) very low melting point |
| 3. Household appliances | - | c) detect charges |
| 4. Electroscope | - | d) electrolyte |
| 5. A fuse | - | e) parallel circuit |

[Ans: 1.d 2.a 3.e 4.c 5.b]

V. Answer briefly.

1. What is static electricity?

Static electricity is the accumulation of electric charges on the surface of non-conducting materials. It is called static because there is no current flowing.

2. Define discharging.

When a charged body comes into contact with a uncharged body, the charges jump from the charged body to the uncharged body till the charges on the two bodies becomes equal.

3. What is electrolysis?

The decomposition of molecules of a solution into positive and negative ions on passing an electric current through it, is called electrolysis.

4. What is an electric eel?

- The electric eel is a species of fish, which can give electric shocks of upto six hundred fifty watts of electricity.
- But if the eel repeatedly shocks, its electric organs becomes completely discharged. Then a person can touch it without being shocked.

5. What is a circuit? Mention its types.

- The closed conducting path through which the electrons flow from one terminal to another terminal of the source is called electric circuit. These are three kinds of circuit. They are:
- Simple circuit, Series circuit and parallel circuit.





6. What are the applications of electrolysis?

The process of electrolysis has a number of applications like, electroplating, electro refining, electro manufacturing.

VI. Answer in detail.

1. What are the safety measures that could be taken during lightning?

- Do not shelter under a tree during thunderstorm. If the tree gets struck by the lightning, it could catch fire and cause great harm to you.
- We can shelter inside our homes, car or buses.
- We should not run across a large open fields or high grounds.
- If we can't find a safety place we must squat down in a low lying place.

2. Explain the working of a lightning arrestors.

- In order to protect tall buildings from lightning, the lightning arrestors are used.
- It is a metal rod with pointed edges. It is fixed at the top of the buildings to be protected.
- This rod is connected to the ground with a help of a conducting cable.
- The lower end of the cable is connected to the copper plate buried deep into the earth.
- When lightning strikes the rod, the electric charges are carried harmlessly to the ground through the cable.

3. What are the applications of heating effect of electric current?

Heating effect of electric current can be seen in many devices. Some of them are:

a) A fuse:

- A fuse is a strip of alloy wire which is made up of lead and tin, with very low melting point.
- This can be connected to the circuit. When current passing through the wire exceeds the maximum limit it gets heated up.
- Due to low melting point it melts quickly disconnecting the circuit. This prevents damage to the appliances.

b) Electric cookers:

- Electric cookers turns red hot when electric current is passed through the coil.
- The heat energy produced is absorbed by the cooking pot through conduction.

c) Electric kettles:

- The heating element is placed at the bottom of the kettle such that the liquid which is to be heated covers it.
- The heat is then absorbed by the liquid and distributed throughout the liquid by convection.



UNIT TEST : 2

ELECTRICITY

Time: 30 mins

Marks: 25



I. Choose the correct answer.

4×1=4

- _____ is a negatively charged particle.
a) electron b) proton c) neutron
- In electroplating the metal to be coated is taken as _____.
a) anode b) electrolyte c) cathode
- During charging _____ are transferred from one object to another.
a) protons b) electrons c) neutrons
- The lower portion of a charged cloud generally carries _____.
a) positive charge b) negative change c) no change

II. Fill in the blanks.

5×1=5

- Atom is generally electrically _____.
- When a glass rod rubbed with silk cloth is brought near an inflated balloon it _____ the balloon.
- _____ is an application of chemical effects of electric current.
- _____ is the unit of electrical force or electric pressure.
- The flow of electric charge through a material is called _____.

III. Match the following.

5×1=5

- | | | |
|----------------------|---|--------------------|
| 10. copper plates | - | lightning arrestor |
| 11. plastic | - | attract each other |
| 12. electroscope | - | conductors |
| 13. lightning | - | insulators |
| 14. opposite charges | - | detect charges |

IV. Answer briefly.

3×2=6

- Define electroplating.
- What are the ways in which a body can be charged?
- What are conductors and insulators. Give example.

V Answer in detail.

1×5=5

- Draw and explain the working of an electroscope.

