DELHI PUBLIC SCHOOL, JAMMU
SESSION (2021-22)
FOUNDATION WORKSHEET
SUBJECT-SCIENCE
CLASS-X

Physics

Chapter: Current Electricity

Topic's: Charge, Current, Potential and Ohm's law

Charge: It is the property of the matter which gives rise to electric and magnetic forces. It is denoted by symbol, **q or Q**

Mathematically,

$Q=\pm ne=It$

Where Q is the charge, 'n' is the number of electrons and I'' is the current and't' is the time for which current flows.

Charge is a **scalar** physical quantity.

Its SI unit is **coulombs** and its other unit is **ampere second or (As)**

Current: It is defined as the rate of flow of charge through a conductor when connected through battery.

In SI system current is defined as the quantity of electric charge flowing through a conductor in one second.

Mathematically,

$$(\quad) \quad I(\text{current}) = \frac{Q(\text{charge})}{t \text{ time}}$$

1 ampere (A):- Current flowing through a conductor is said to be one ampere when a charge of one coulomb flows through a given conductor for one second.

i.e. ,$I = 1A \text{ if } Q = 1C \text{ and } t = 1s$.

Current is also measured in smaller units like,

1. milliampere $(mA) = 10^{-3}A$
2. microampere $(1\mu A)=10^{-6}A$

Electric potential: - It is defined as the amount of work done in bringing a unit positive charge from infinity to a given point within a electric field of Mathematically,

$$V = \frac{W(\text{work done})}{q(\text{charge})}$$

Potential difference:- It is defined as the amount of work done in bringing one unit positive charge from one point to another point. Mathematically,

$$\Delta V = V_B - V_A = \frac{W_B}{q} - \frac{W_A}{q}$$

Ohm's law:-

It states that at constant temperature (or keeping physical conditions constant like temperature, pressure and heat), the current flowing through a conductor is directly proportional to the potential difference across the conductor. Mathematically,

$I \propto V$ (when temperature is constant)

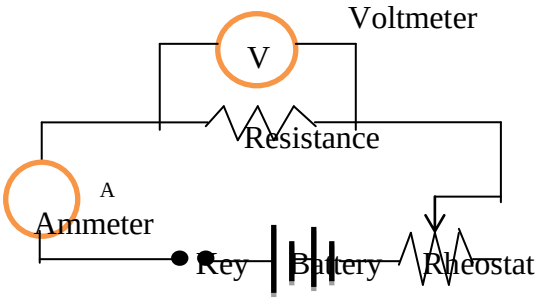
Or $I = \frac{V}{R} \Longrightarrow V = IR$, where R is the resistance of the conductor.

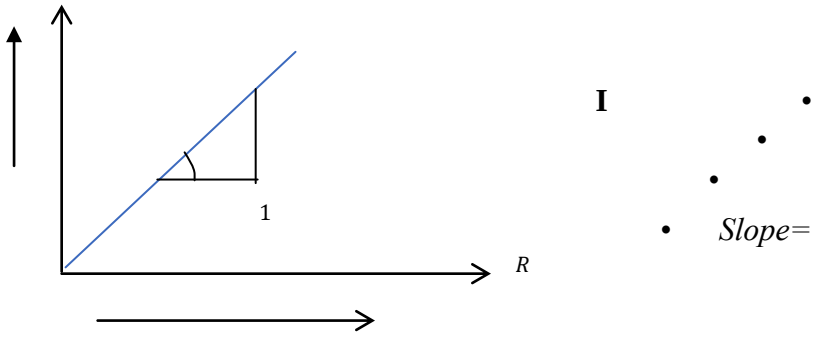
To prove the Ohms law experimentally, first we make the following connections.

In the given circuit diagram, we connect Battery, key, ammeter, resistance, Rheostat in series and then connect voltmeter in parallel with resistance.

First we close the key so that current flows in the circuit and after that adjust the rheostat so that minimum current flows in the circuit.

After setting minimum current increase the value of current by adjusting Rheostat and measure current shown by ammeter and also measure corresponding value of potential difference from voltmeter. Similar way, take five to six values of current and potential difference and draw a graph between potential V (taken along x-axis) and current I (taken along y-axis). **Circuit Diagram:**





We observed a straight line graph between potential V and current I.

This straight line graph shows that the ratio $\frac{V}{I}$ is constant i.e. $R_1 = R_2 = R_3 = R_4 = R_5 = R$, hence R is constant for a given conductor and this indicates that the current flowing through the resistor is directly proportional to the potential difference.

This is what Ohm's law and verified experimentally.

Also from this graph we can easily find the resistance from the slope, i.e.

Resistance $R = \frac{1}{\text{Slope of straight line}}$

Worksheet Very Short Answer Questions

1. Define Ohm's law.
2. What is the SI unit of current and potential?
3. Define 1 ampere.

Short Answer Questions

4. How Ammeter and Voltmeter are connected in Ohm's law?
5. Which physical quantity decides the flow of charge in a conductor? Explain.
6. Current is measured by _____ device and potential is measured by _____ device

Long Answer Questions

7. What conclusions can be drawn from Ohm's law? Explain each of them.
8. (a) Why temperature should be maintained to prove Ohm's law?

   (b) What is the nature of graph in Ohm's law? Also give its significance.

   (c) What is the significance of slope in Ohm's law?

Chemistry

Chapter: Chemical Reactions and Equations Introduction:

Physical Change: If a change involves change in the physical properties but no new substance is formed, then it is a physical change. No change occurs in the identity of the substance. Some examples are:

a) Melting of ice
b) Boiling of water
c) Dissolution of sugar in water

Chemical Change: If a change involves formation of new substances, it is a chemical change. The original substances lose their nature and identity and form new chemical substances. Some examples are:

a) Cooking of food
b) Fermentation of grapes
c) Burning of fuels

A **chemical reaction** involves a chemical change in which substances react to form new substances with entirely new properties. Substances that react or take part in the reaction are known as **reactants** and the substances formed are known as **products**.
During a chemical reaction, there is a breaking of bonds between atoms of the reacting molecules to give products.

For example: When the **magnesium** metal burns it reacts with oxygen found in the **air** to form **Magnesium Oxide**. Oxygen and **magnesium** combine in a chemical reaction to form this compound. After it burns, it forms a white powder of the **magnesium oxide**.

A chemical reaction can be observed with the help of the following observations. The easily observable changes that take place in a chemical reaction are called **characteristics** of the chemical reaction. These are: 1.Change in temperature
2.Formation of a precipitate
3.Evolution of gas
4.Change of state
5.Change in color

(1) Change in temperature: Some reactions are accompanied by the rise or fall in temperature.
a) Exothermic reaction : If heat is evolved during a reaction, then such a reaction is known as exothermic reaction.

For example: Calcium oxide reacts vigorously with water to produce slaked lime releasing large amount of heat which increase the temperature.
b) Endothermic reaction : If heat is absorbed from the surroundings, then such a reaction is known as endothermic reaction.

For example: On mixing ammonium chloride with barium hydroxide, the temperature decreases as heat is absorbed.

(2) **Formation of precipitate** : An insoluble solid known as precipitate is formed during a reaction. Such reactions are also known as precipitation reactions.
For example: Formation of **white precipitates** of barium sulphate when solution of barium chloride is mixed with solution of sodium sulphate.

(3) **Evolution of gas** : Some reactions are accompanied by the evolution of gas. **For example**: Formation of **hydrogen gas** by the action of dilute sulphuric acid on zinc granules.

(4) **Change of state** : Some reactions are accompanied by change in state. **For example**: Hydrogen gas burns in air to form water in **liquid state**.

(5) **Change in colour** : Some reactions are accompanied by change in colour.
For example: On heating ferrous sulphate crystals the **green colour** of crystal changes.

Chemical equation :

The symbolic representation of a chemical reaction is called a **chemical equation**. The features of a chemical equation are:

- The reactants are written on the left hand side with a plus sign between them.
- The products are written on the right hand side with a plus sign between them.
- An arrow separates the reactants from the products. The arrow head points towards the products and indicates the direction of the reaction.

Skeletal chemical equation: A chemical equation which simply represents the symbols and formulas of reactants and products taking part in the reaction is known as skeletal chemical equation for a reaction.

For example: For the burning of Magnesium in the air, $Mg + O2 \rightarrow MgO$ is the skeletal equation.

Worksheet Very short answer questions

Q1. What is a chemical equation?

Q2. Name the gas evolved when zinc reacts with dil. HCl.

Q3. Is souring of milk a physical or a chemical change?

Short answer questions

Q4. Why should a magnesium ribbon be cleaned before burning in air?

Q5. What are exothermic and endothermic reations? Give examples.

Q6. Differentiate between physical and chemical changes.

Long answer questions

Q7. Describe an activity to show the formation of a precipitate and evolution of gas during a chemical reaction.

Q8. Translate the following statements into chemical equations.

a) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

b) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

c) Calcium carbonate on heating breaks to form calcium oxide and carbon dioxide gas.

d) Hydrogen combines with nitrogen to form ammonia

e) Methane burns in air to give carbon dioxide and water.

Biology

Chapter: Life processes
Topic: Nutrition in plants and Photosynthesis (Definition and importance)

Introduction:

- Life processes are the basic functions performed by living organisms to survive on earth. It has to be performed uninterruptedly in both active and inactive stage of organism. Some of the life processes are nutrition, respiration, transportation, excretion, control and coordination, growth .

- The term living thing refers to things that are now or once were alive. A non-living thing is anything that was never alive. In order for something to be classified as living, it must grow and develop, use energy, reproduce, be made of cells, respond to its environment, and adapt.

Nutrition

- Food is an organic substance. The simplest food is glucose also called simple sugar.
- A more complex food is starch. It is made from glucose. • The general name of substances like glucose and starch is 'carbohydrates'.

Nutrient: A nutrient can be defined as a substance which an organism obtains from its surroundings and uses it as a source of energy or for the biosynthesis of its body constituents.

Example: carbohydrates and fats are the nutrients which are used by the organism mainly as a source of energy.
Proteins and mineral salts are nutrients used by organism for the biosynthesis of its body constituents like skin, blood, etc.

Nutrition:
Nutrition is the process of intake of nutrients (like carbohydrates, fats, proteins, minerals, vitamins and water) by an organism as well as the utilization of these nutrients by the organism.

Mode of Nutrition:
Mode of nutrition means method of obtaining food by an organism. There are mainly two modes of nutrition:
1. Autotrophic mode of nutrition
2. Heterotrophic mode of nutrition

Autotrophic mode of nutrition: ('auto' means 'self' and 'trophe' means 'nutrition')

- Autotrophic nutrition is that mode of nutrition in which an organism makes (or synthesizes) its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings (with the help of sunlight energy).
- Those organisms which can make their own food from carbon dioxide and water are called autotrophs.

• Example: all green plants, autotrophic bacteria.
• Autotrophs make their food by photosynthesis.

Types of Autotrophic nutrition

• There are two types of autotrophs: photoautotrophs and chemoautotrophs. Photoautotrophs get their energy from sunlight and convert it into usable energy (sugar). This process is called photosynthesis.

Heterotrophic mode of nutrition: ('heteros' means 'others' and 'trophe' means 'nutrition') • Heterotrophic nutrition is that mode of nutrition in which an organism cannot make (or synthesizes) its own food from simple inorganic materials like carbon dioxide and water, and depends on other organisms for its food.

• Those organisms which cannot make their own food from inorganic substances like carbon dioxide and water, and depends on other organisms for their food are called heterotrophs.
• Example: all the animals (man, dog, cat, lion, etc.), most bacteria and fungi.

Types of Heterotrophic Nutrition:

Heterotrophic mode of nutrition is of three types:

1. Saprotrophic (saprophytic) nutrition
2. Parasitic nutrition
3. Holozoic nutrition

Saprotrophic nutrition:

• Saprotrophic nutrition is that nutrition in which an organism obtains its food from decaying organic matter of dead plants, dead animals and rotten bread, etc.
• The organisms having saprotrophic mode of nutrition are called saprophytes.
• Saprophytes are the organisms which obtain food from dead plants (like rotten leaves), dead and decaying animal bodies, and other decaying organic matter.
• Example: Fungi (liker bread moulds, mushrooms), and many bacteria.

Parasitic nutrition:

• The parasitic nutrition is that nutrition in which an organism derives its food from the body of another living organisms without killing it.
• A parasite is an organism (plant or animal) which feed on another living organism called its host.
• Example: some animals like Plasmodium and roundworms, a few plants like Cuscuta (amarbel) and several fungi and bacteria.

Holozoic nutrition:

- The holozoic nutrition is that nutrition in which an organism takes the complex organic food materials into its body by the process of ingestion, the ingested food is digested and then absorbed into the body cells of the organism.
- Example: human beings and most of the animal.

Amoeba follows holozoic mode of nutrition in which the solid food particles are ingested which are then acted upon by enzymes and digested. ... Amoeba engulfs food by temporary finger-like projections of its body surface called pseudopodia. When a pseudopodium fuses with the food particle, it forms a food vacuole.

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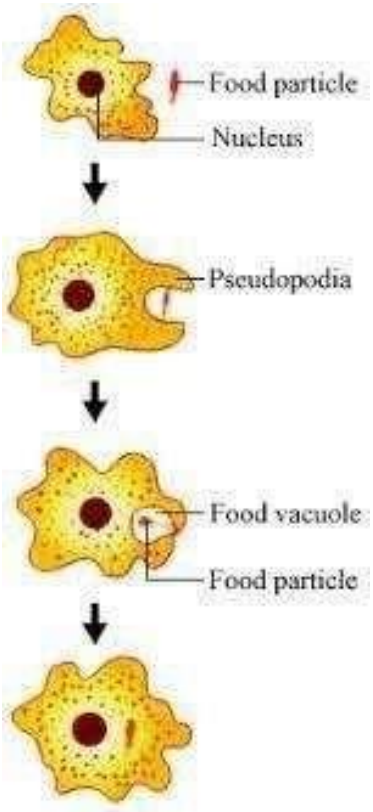
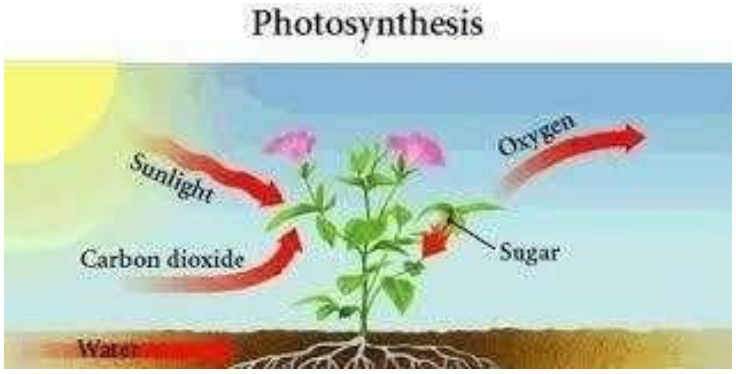


- The primary nutrients are nitrogen, phosphorus and potassium. ...
- The intermediate nutrients are sulfur, magnesium, and calcium. ...
- The remaining essential elements are the micronutrients and are required in very small quantities.

Photosynthesis

1. The process by which green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a by-product.

During photosynthesis, oxygen gas is liberated out into the environment and is utilized by humans, animals and other living species during the process of respiration.
The raw materials of photosynthesis, water and carbon dioxide, enter the cells of the leaf, and the products of photosynthesis, sugar and oxygen, leave the leaf.



Photosynthesis takes place inside plant cells in small objects called chloroplasts . ...Plants get carbon dioxide from the air through their leaves, and water from the ground through their roots. Light energy comes from the Sun. The oxygen produced is released into the air from the leaves.

WORKSHEET VERY SHORT ANSWER QUESTIONS

1.What are nutrients?

2.Name the different types of heterotrophic nutrition?

3.What are saprotrophs?

SHORT ANSWER QUESTIONS

4.What type of nutrition is shown in amoeba? What does it diet include?

5.How does photosynthesis occur in plants?

6.What is the importance of Photosynthesis?

7.How does a plant get nutrients? What are essential nutrients in plants?

LONG ANSWER QUESTIONS

8. Differentiate between Autotrophic nutrition and heterotrophic nutrition

9. Differentiate between Living and Non –Living things.

NOTE: Kindly read the above detail of each subject and do the questions in your physics, chemistry and biology notebook.(interleaf notebook).