Chapter 7.1: Electricity

1. Introduction to Electricity

- **Electricity in Daily Life**: Used in appliances like washing machines, televisions, and computers.
- **Importance of Energy**: Energy is required for all living things to function.

Example Sentence: Electricity is essential for operating various home appliances.

2. Energy

- **Definition**: Energy is the ability to do work.
- **Daily Activities Using Energy**:
  - Running
  - Photosynthesis in plants
  - Cars moving using fuel
  - Light bulbs producing light

Example Sentence: Energy powers daily activities such as running and plant growth.

3. Forms of Energy

- **Sound Energy**
- **Kinetic Energy**
- **Electrical Energy**
- **Gravitational Potential Energy**
- **Elastic Potential Energy**
- **Light Energy**
- **Nuclear Energy**
- **Heat Energy**

- **Chemical Energy**

Example Sentence: Different forms of energy include kinetic energy from running and light energy from bulbs.

4. Sources of Energy

- **The Sun**
- **Geothermal**
- **Water**
- **Biomass**
- **Fossil Fuels**
- **Radioactive Substances**
- **Wave Energy**
- **Wind Energy**

Example Sentence: The Sun is a primary source of energy for various processes on Earth.

5. Electrostatic Charges

- **Definition**: Transfer of electric charges resulting in static electricity.
- **Examples**: Feeling a shock when touching a doorknob.
- **Properties**:
  - **Same Charges**: Repel each other.
  - **Opposite Charges**: Attract each other.

Example Sentence: Electrostatic charges cause the shock felt when touching a doorknob.

6. Electroscope

- **Purpose**: Detects the existence of electric charges on an object.
- **Working Principle**:

- **Neutral 中立 Strip**: No divergence 偏差.
- **Positively Charged Strip**: Diverges because same charges repel 相斥.
- **Negatively Charged Strip**: Diverges similarly.

Example Sentence: An electroscope is used to detect and measure electrostatic charges.

7. Examples of Electrostatics in Daily Life

- **Lightning**: Caused by friction between clouds and air, creating an electric charge.
- **Lightning Conductor**: Provides a safe path for electric charges, protecting buildings.

Example Sentence: Lightning is a natural phenomenon related to electrostatic charges.

8. Electric Current

- **Definition**: The rate of flow of electric charges through a conductor.
- **Sources**:
  - Electrical Generators
  - Dry Cells
  - Solar Cells

Example Sentence: Electric current is essential for the operation of electrical appliances.

9. Measuring the Quantity of Electricity

- **Ammeter**: Measures electric current (ampere, A).
- **Voltmeter**: Measures voltage (volt, V).

Example Sentence: An ammeter is used to measure the flow of electric current in a circuit.

10. Ohm's Law

- **Formula**: V = IR (Voltage = Current × Resistance)
- **Explanation**: The electric current flowing through a conductor is directly proportional to the voltage across it, provided other conditions remain unchanged.

Example Sentence: Ohm's Law helps in understanding the relationship between voltage, current, and resistance in an electrical circuit.

Summary

- Electricity is fundamental in daily life, powering various appliances and devices.
- Energy, defined as the ability to do work, exists in multiple forms including kinetic, electrical, and light energy.
- Energy sources include the sun, geothermal, water, and fossil fuels.
- Electrostatic charges result in phenomena like static electricity and lightning.
- Electric current is the flow of electric charges through a conductor, measured by ammeters.
- Ohm's Law (V = IR) describes the relationship between voltage, current, and resistance in electrical circuits.