

Chapter: Heat

1. Definition of Heat:

- Heat is a form of energy that flows from a hotter object to a colder one. It can be transferred through conduction, convection, and radiation.

2. Sources of Heat:

- Natural Sources: Sun, geothermal energy.
- Artificial Sources: Combustion, electrical appliances.

3. Effects of Heat:

- Expansion and Contraction: Most substances expand when heated and contract when cooled.
- Change of State: Heat can change a substance's state (solid to liquid, liquid to gas).
- Change in Temperature: Measured in degrees Celsius or Fahrenheit.

4. Temperature according to the Kinetic Theory of Molecules:

- Temperature is related to the average kinetic energy of particles in a substance.
- Higher temperature means higher kinetic energy.

5. Three Different Scales of Temperature:

- Celsius Scale: Based on the freezing and boiling points of water.
- Fahrenheit Scale: Widely used in the United States.
- Kelvin Scale: Absolute temperature scale with no negative values.

6. Devices Used to Measure Temperature:

- Thermometer: Instrument for measuring temperature.
- Thermometric Liquid: Substance inside the thermometer that expands or contracts with temperature changes.

7. Anomalous Expansion of Water:

- The process in which water expands when cooled from 4°C to 0°C, unlike most substances that contract is called Anomalous Expansion of water

- Ice is less dense than liquid water, allowing it to float.

8. Applications of Anomalous Expansion of Water:

- Aquatic Life: Ice forms on the surface, insulating water below, allowing fish to survive.
- Weather Patterns: Large water bodies moderating climate.

9. Specific Heat Capacity and its Unit:

- Specific Heat Capacity: Amount of heat required to raise the temperature of 1 kg of a substance by 1 degree Celsius.

- Unit: Joules per kilogram per degree Celsius (J/kg°C).

10. Applications of Specific Heat Capacity:

- Cooking: Different materials require different amounts of heat.
- Thermal Comfort: Understanding how materials influence indoor temperature.

11. Heat Equation:

- $Q = ms\Delta t$
- Q: Heat transferred, m: Mass, s: Specific heat capacity, Δt : Change in temperature.

12. Principle of Calorimetry:

- Calorimetry is the measurement of heat transfer.
- Principle: Heat lost by one body equals the heat gained by another in an isolated system.