

HEAT

1. WHAT IS HEAT ?

Heat is a form of energy that transfers from one object to another due to a temperature difference, flowing from the hotter object to the cooler one. Its S.I unit is Joule(J).

1 calorie = 4.184 joules

- Heat is **not a substance**, but a process of energy transfer.

2. WHAT IS SPECIFIC HEAT?

Specific heat is the amount of heat energy required to raise the temperature of one unit mass of a substance by one degree Celsius (or one Kelvin).

3. WHAT IS THERMAL CONTACT ?

Thermal contact refers to the physical connection between two bodies that allows for the transfer of thermal energy from a body with a higher temperature to a body with a lower temperature.

4. WHAT IS TEMPERATURE ?

Temperature is the degree of hotness or coldness of a body compared to other bodies around it.

Kelvin (K) – SI unit, used in scientific work.

Celsius (°C) – Commonly used in daily life.

Fahrenheit (°F) – Used mainly in the USA.

5. What is Thermal Equilibrium ?

Thermal equilibrium is a condition in which two or more objects or systems in contact with each other have no net flow of heat between them. This happens when all objects involved have the same temperature.

6. What is temperature Scale ?

Scale of temperature is a methodology of calibrating the physical quantity temperature in metrology.

1. Celsius Scale (°C)

Also known as the Centigrade scale.

Based on the freezing point (0°C) and boiling point (100°C) of water at 1 atmosphere pressure.

Commonly used in everyday life, weather forecasts, and thermometers.

2. Fahrenheit Scale ($^{\circ}\text{F}$)

Used mainly in the United States.

On this scale:

Freezing point of water = 32°F

Boiling point of water = 212°F

The scale divides the range between freezing and boiling into 180 equal parts.

3. Kelvin Scale (K)

The SI unit of temperature.

Starts from absolute zero (0 K), the point where molecular motion stops.

No negative temperatures on this scale.

$0^{\circ}\text{C} = 273.15\text{ K}$

Used in scientific research and thermodynamics.

7. What are the heating effect ?

Change in Temperature

When heat is added to a substance, its temperature increases.

Example: Water becomes hot when heated on a stove.

Change in State (Physical Change)

Heat can cause substances to change state—solid to liquid, liquid to gas, etc.

Example: Ice melts into water, and water boils into steam.

Expansion of Substances

Most materials expand when heated and contract when cooled.

Example: Railway tracks have gaps to allow for expansion in summer.

Chemical Changes

Heat can cause chemical reactions to happen faster or start entirely.

Example: Cooking food involves heat-driven chemical changes.

Change in Pressure (in gases)

Heating a gas increases its pressure if kept in a closed container.

Example: Pressure cookers work by trapping heat and increasing pressure.