Heat

The sum of potential energy and kinetic energy of a molecule is called its internal energy. The total internal energy is the heat energy possessed by it.

Units of Heat

Joules - S.I. unit of Heat

Calorie - One calorie is the quantity of heat required to raise the temperature of 1g of water from 14.5°C to 15.5°C

1 cal = 4.186 J

1 kilo-calories = 1000 J

Temperature

It is the parameter which tells the thermal state of a body. It determines the flow of direction of flow of heat when two bodies at different temperatures are placed in contact.

Unit of Temperature

S.I. unit - Kelvin (K)

Other unit - Degree Celsius (°C)

T K = 273 + t°C

Δt °C = ΔT K

The zero in kelvin scale is called the **absolute zero**. It is the temperature at which all molecular motion stops.

Factors Affecting the Quantity of Heat Absorbed

Mass	$Q \propto m$
Increase in temperature	$Q \propto \Delta t$
Specific heat capacity of the substance	$Q \propto c$
Thus, Heat absorbed	$Q = c.m.\Delta t$

Differences between Heat and Temperature

Heat	Temperature
It is a form of internal energy obtained due to random motion & attractive forces of molecules in a substance.	It is the parameter which determines the direction of flow of heat when two bodies are kept in contact.
S.I. unit - Joule	S.I. unit - Kelvin
Measured by principle of calorimetry.	Measured using thermometer.

Heat Capacity

The heat capacity of a body is the amount of heat energy required to raise its temperature by 1 K. It is represented by C'

$C' = Q / \Delta t$

Unit - S.I. - Joules per Kelvin ($J\ K^{-1}$)

Specific Heat Capacity

The specific heat capacity of a substance is the heat capacity per unit mass of the body of the substance. It is represented by c.

$c = C' / m$

$c = Q / m \Delta t$

Unit - S.I. - Joules per Kilogram per Kelvin ($J.kg^{-1}K^{-1}$)

Principle of Calorimetry

It states that if two bodies of different temperatures are kept in contact with each other, the energy transfers from the hot body to the cold body till they attain the same temperature.

Thus, if no heat is lost to the environment - Heat lost by the hot body = Heat gained by the cold body

Calorimeter

It is a vessel to measure the amount of heat gained or lost by a body when mixed with another body. It is made up of thin sheet of copper as it is a good conductor of heat and it has a low specific heat capacity so it can acquire the temperature of its contents with little amount of heat. To avoid heat loss through radiation the inner side is polished. To avoid heat loss through conduction it is insulated with wood and the space between the wood and the copper is a poor conductor. To avoid heat loss through convection a wood lid is placed on the top. The lid has two holes, one for the thermometer and the other for the stirrer..

Latent Heat

The heat energy when absorbed or liberated and is not externally manifested by rise or fall in temperature is called latent heat.

Specific Latent Heat

The specific latent heat of a phase is the quantity of heat energy absorbed by the unit mass of the substance for the change in its phase at a constant temperature.

$Q = m\ L$