

Definitions

Thermodynamics is
that branch of
science which deals
with energy transfer

System: A thermodynamic system represents a specified quantity of matter under consideration to analyze a problem, so as to study the change in properties of the specified quantity of matter due to exchange of energy-in the form of heat and work. A **system** may be closed, open or isolated system

homogeneous system

is one which consists of
a single
phase

heterogeneous system

is one which consists of
two or more phases.

property of a system is
a characteristic of the
system which depends
upon its state, but not
upon how the state is
reached

When neither-mass nor energy is allowed to - cross, the boundary of system it is known as

Isolated system.

State of a system

indicates the specific condition of a system

- **Intensive properties:** The properties which are independent of the mass of system are known as intrinsic properties. Intensive properties are independent of the size of system
- **Extensive properties** The properties which are dependent on the mass of a system are known as extensive or extrinsic properties. Volume, mass, internal energy, enthalpy and entropy are the examples of extensive properties.

A system is in
thermodynamic
equilibrium if there is no
change in any
thermodynamic properties
of a system where it is
isolated from its
surroundings.

Process: The mode in which the change of state of a system takes place is termed as process.

Cyclic process: It refers to a typical sequence of processes in such a fashion that the initial and final states are identical.

Heat (Q): is a type of energy which is transferred beyond the boundary of a system because of the difference in temperature between system and surroundings. Heat is not a property of system because it is not dependent on the end states but depends upon the path followed to achieve a particular state.

Certain common processes
are given special names:

- **isothermal process**:

constant temperature,

- **isobaric process** : constant
pressure, and

- **isochoric process** :
constant volume.

Boundary: The thermodynamic system and surroundings are separated by an envelope is called boundary of system.

Surroundings: is defined as everything outside the system.

Universe: System and surroundings when put together result in universe.

$$\text{Universe} = \text{System} + \text{Surroundings.}$$

Zeroth law of thermodynamics:

It states if the bodies A and B are in thermal equilibrium with a third body C separately, then the two bodies A and B shall also be in thermal equilibrium with each other.