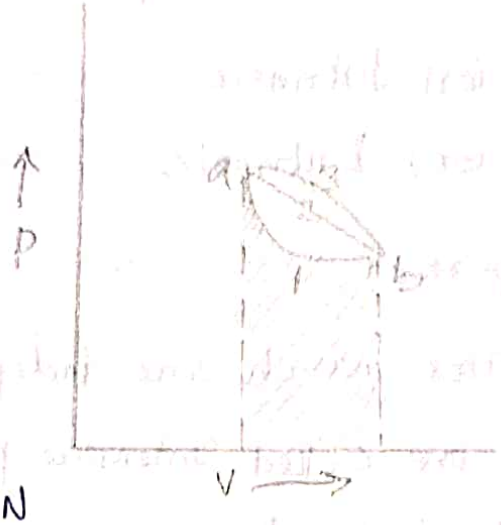
Path and Point functions.



POINT FUNCTION

> when a gas undergoes a change from initial value to final value, the thermodynamic properties will change.

> Some of the properties like pressure, volume and temperature are not dependant upon the path followed by the system.

> It is purely independent of the path followed by a process.

> These properties are called as point functions or state function

> The properties like pressure and volume do not depend upon the path [a-1-b or a-2-b] followed by the gas.

> It requires end point only.

PATH FUNCTION

> The properties like work transfer, heat transfer etc.. are dependent upon the path followed by a gas. These properties are called as path function.

> The work transfer for the path a-1-b is less than that of the path a-3-b.

> It is dependent of the path followed by a gas.

INTENSIVE AND EXTENSIVE PROPERTIES

Properties of a system is its measurable characteristic describing the system. The measurable characteristics are temperature, pressure, volume, surface area etc.

The properties are classified as two Categories

(a) Intensive (or) Intrinsic

(b) Extensive (or) Extrinsic

(a) Intensive properties.

The properties which are independent on the mass of the system are called Intensive properties. If we Consider a part of the system these properties remain same.

Ex. pressure, temperature, Specific Volume, Density, Velocity.

(b) Extensive properties:

These properties are dependent upon the mass of the system. If we consider a part of the system, these properties has lesser value.

Ex. Mass, Volume, Total energy, weight, all forms of energy.

Thermodynamic Equilibrium

A system if does not tend to undergo any change of state on its own accord, then it is in equilibrium. The properties of the system are uniform in this state.

Thermal equilibrium - Equality of temperature

Mechanical equilibrium - Equality of pressure and forces

Chemical - Equality of chemical potential

A system which is in a state of Mechanical equilibrium, thermal equilibrium and chemical equilibrium is said to be in a state of thermodynamic equilibrium.

(e.g) ① Hot iron rod left in atmosphere loses heat on its own and will come to thermal equilibrium

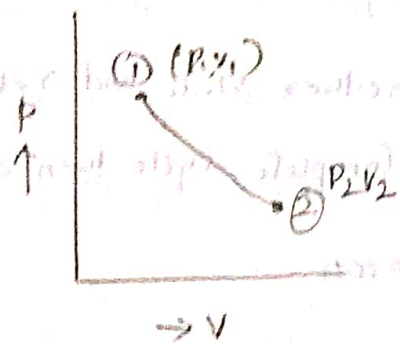
② Ice left in atmosphere gains heat and will come to thermal equilibrium

③ A pendulum when given an oscillation, after some time it will come to rest on its own.

Path and Process

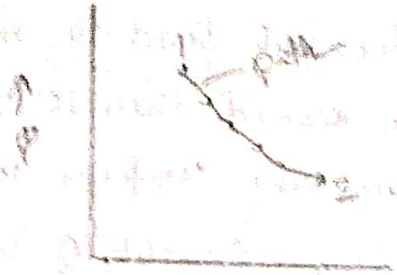
State:

The state is the unique condition of the system at any instant of time. described by its properties such as pressure, temperature, volume etc.



If the properties changes the state will change.

path



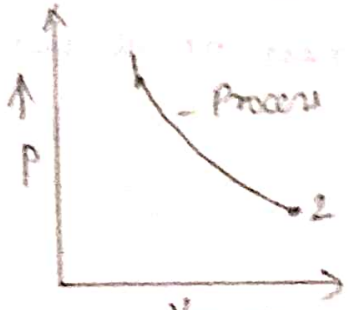
When a System undergoes change in its State the line joining the series of intermediate States thro. which the System has passed is known as path.

This in a control volume and in a thermodynamic sys

Process

The line joining the series of State points through which the System has undergone a change of State fro initial to final.

The path connecting the change of State of the sys is specified, then this path is called process.



(e.g) Constant pressure process, Constant volume proce

~~Process~~ Cyclic process

If a System undergoes a series of proces from one State to another State and returns to its initial State by forming a complete cycle then a System is said t undergo cyclic process.