

~~XXXXXXXXXX~~  
~~XXXXXXXXXX~~ PARWAT  
 SECTION ~~XXXX~~ VB

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Thermodynamics:-

Def:- "The study of the energy transferring from one body to another or <sup>from</sup> one location to another & at a certain rate is known as ~~heat transfer~~ thermodynamics.

Fluid Mechanics:-

Def:- "The study of fluid motion under the externally applied forces & the transformation b/w the mechanical & thermal forms during this motion, is known as fluid mechanics".

Material Sciences:-

Def:- "The study of the relative amount of various structural forms of materials present in solids & how these forms change under different conditions is called material sciences".

Thermodynamic Property:-

Def:- "The <sup>intrinsic</sup> inheritance characteristics of a substance which can be measured is called the property or thermodynamic property of the substance".

## Thermodynamic Equilibrium:-

Def # 1:-

"When mechanical, chemical & thermal forces are in equilibrium in an isolated system, the system is said to be in thermodynamic equilibrium."

Def # 2:-

"The system is said to be in thermodynamic equilibrium if it is in:

- 1) Chemical equilibrium.
- 2) Mechanical equilibrium.
- 3) Thermal equilibrium.

## Chemical Equilibrium:-

Def # 1:-

"A system is said to be in chemical equilibrium, if it has no tendency to undergo further chemical reaction."

Def # 2:-

It may also be defined as:  
"If there is no spontaneous change in the system, the system is said to be in chemical equilibrium."

## Mechanical Equilibrium:-

Def # 1:-

"When there is no unbalanced force & no pressure force across the boundary of the system, the system is said to be in mechanical equilibrium."

$$\Delta P = 0$$



Def #2:-

"The system is said to be in mechanical equilibrium if there is no pressure change or any change in the kinetic energy or potential energy of the system."

### Thermal Equilibrium:-

Def:-

"If all the parts of a system are at the same temperature, the system is said to be in thermal equilibrium."

Therefore:

Thermodynamic Equilibrium = [Mechanical + Thermal + Chemical] equilibrium.

### Temperature:-

$$^{\circ}R = 1.8 K$$

$$K = ^{\circ}C + 273$$

$$^{\circ}R = ^{\circ}F + 460$$

Also:

$$0 K = -273.15^{\circ}C = -459.67^{\circ}F = 0^{\circ}R$$

where

$^{\circ}R$  = Rankine

### Note:-

When units of temp. is expressed in  $^{\circ}F$  then heat is in B.E.S

Pressure :-

$$1 \text{ bar} = 10^5 \text{ N/m}^2 = 10^5 \text{ Pa}$$

$$1 \text{ MPa} = 145 \text{ PSI (Pound Square Inch)}$$

$$1 \text{ atm} = 14.7 \text{ PSI} = 1.01325 \text{ bar}$$

Thermodynamics Work :-

Def :-

"Thermodynamically, work is said to be done by a system if the sole effect (external to the system i.e. (surrounding)) could be the raising of a weight".

Heat :-

Def #1 :-

"During an energy transfer process which results from temperature difference b/w the two bodies, the energy so transferred is called heat".

Def #2 :-

"A form of energy that is transferred across the boundary of the system at a given temperature to another system (surrounding) at a lower temperature by virtue of the temperature difference b/w the systems (surrounding)".

Explanation :-

Therefore;

\* Heat is a transient quantity.

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