



# SNS College of Technology

(An Autonomous Institution)



19AEB204/ Aero Engineering Thermodynamics  
Unit-1 BASIC CONCEPT AND FIRST LAW OF  
THERMODYNAMICS (2MARKS)

**1. Define thermodynamic system.**

Thermodynamics is the science of energy transfer which deals with the relations among heat, work and properties of systems.

The name 'thermodynamics' is derived from the Greek words therme, meaning 'heat' and dynamis meaning power. Thus, thermodynamics is basically the study of heat and power.

**2. Name the different types of system.**

There are three types of thermodynamic systems :

1. Closed System
2. Open System and
3. Isolated System

**3. Define an isolated system.**

Isolated system is not affected by surroundings. There is no heat, work and mass transfer take place. In this system total energy remains constant.

Example: Entire Universe

**4. Differentiate closed and open system.**

Closed System	Open System
There is no mass transfer. Only heat and work will transfer.	Mass transfer will take place, in addition to the heat and work transfer.
System boundary is fixed one	System boundary may or may not change.
Ex: Piston & cylinder arrangement	Air compressor, boiler

**5. What is meant by surroundings and boundary?**

Any other matter out side the system boundary is called as surroundings. System and surroundings are separated by an imaginary line is called boundary.

**6. What is meant by thermodynamic property?**

Thermodynamic property is any characteristic of a substance which is used to identify the state of the system and can be measured, when the system remains in an equilibrium state.

**7. How do you classify the property?**

Thermodynamic property can be classified into two types.  
Extensive and Extrinsic property.

**8. State the First law of thermodynamics.**

First law of thermodynamics states that when system undergoes a cyclic process the net heat transfer is equal to work transfer.



**9. Define: PMM of first kind.**

PMM of first kind delivers work continuously without any input. It violates first law of thermodynamics, it is impossible to construct an engine working with this principle.

**10. Define the term process**

It is defined as the change of state undergone by a gas due to energy flow.

**11. Define the term Cycle**

When a system undergoes a series of processes and return to its initial condition, it is known as cycle

**12. Define thermodynamic equilibrium.**

The word equilibrium means balance. An equilibrium state of a thermodynamic system is a state that cannot be changed without any interaction with its surroundings.

If a system is balanced in all respects, it is in a state of thermodynamic equilibrium. Balanced in all respects means :

- There should not be any temperature difference within the system, so that the system is thermally balanced.
- No pressure difference exists between any two points within the system and between the system and surroundings, so that it is mechanically balanced.
- No chemical reaction is taking place, so that it is chemically balanced.
- If two phases are involved, mass of each phase remains constant so that phase equilibrium is achieved.

**13. What do you mean by quasi-static process?**

When a system is taken from one equilibrium state to another, the change is known as process. The series of intermediate states through which a system passes during a process is called the path of the process. If all these intermediate states are equilibrium states, the process is known as quasi equilibrium or quasi-static process.

**14. Define Path and point function.**

Point functions are those for which the change depends on only the end states and not on the path followed. Hence point functions are inexact differentials Path functions are those for which the change depends not only on the end states but also on the path followed. Hence path functions are exact differentials

**15. Explain homogeneous and heterogeneous system.**

Matter can exist in any one of the three phases namely solid, liquid and gas. A system consisting of a single phase is known as homogeneous systems. If the matter exists in more than one phase, the system is known as heterogeneous system.



**16. What is meant by thermodynamic work?**

It is the work done by the system when the energy transferred across the boundary of the system. It is mainly due to intensive property difference between the system and surroundings.

**17. Define Heat.**

Heat is the energy crossing the boundary due to the temperature difference between the system and surroundings

**18. What is a steady flow process?**

During the process the rate of flow of mass and energy across the boundary remains constant, is known as steady flow process

**19. Define Zeroth law of Thermodynamics.**

Consider three bodies A, B and C. If the bodies A and B are in thermal equilibrium with C when brought into contact separately, they are also in thermal equilibrium with each other. This concept is known as zeroth law of thermodynamics.

**20. Differentiate between Microscopic and Macroscopic?**

Statistical Thermodynamics is microscopic approach in which, the matter is assumed to be made of numerous individual molecules. Hence, it can be regarded as a branch of statistical mechanics dealing with the average behaviour of a large number of molecules.

Classical thermodynamics is macroscopic approach. Here, the matter is considered to be a continuum without any concern to its atomic structure

**21. Differentiate reversible process and irreversible process?**

A process is said to be reversible, it should trace the same path in the reverse direction when the process is reversed. It is possible only when the system passes through a continuous series of equilibrium state.

If a system does not pass through continuous equilibrium state, then the process is said to be irreversible.