

1. Heat:

- ➔ In thermodynamics, heat means energy which is moved between two things when one of them is hotter than the other.
- ➔ Adding heat to something increases its temperature, but heat is not same as temperature. Heat can also be defined as the amount of thermal energy in a system.

2. Thermal equilibrium:

“When the temperature of body A is the same as the temperature of body B no heat transfer takes place between the bodies, and they are said to be in thermal equilibrium”.

- ✓ Heat can never be contained in a body or possessed by a body.

3. Work:

- ➔ Work is defined as the product of a force and the distance moved in the direction of the force.
- ➔ When a boundary of a closed system moved in the direction of the force acting on it, then the surroundings do work on the system.
- ➔ When a boundary is moved outwards the work is done by the system on its surroundings.

For thermodynamics:

Assumes constant pressure

$$W = -P\Delta v$$

More general

$$W = - \int P dV$$

Its units are Nm/kg or J/kg.

4. System:

- ➔ A system may be defined as a collection of matter within prescribed and identifiable boundaries.

- Closed system:

In thermodynamics, a closed system can exchange energy (as heat or work) but not matter with its surroundings. E.g. hot bottle.

- Open system:

While open system can exchange energy and matter e.g. fluid in turbine.

5. Principle of conservation of energy:

“When a system undergoes a thermodynamic cycle then the net heat supplied to the system from its surroundings plus the net-work input to the system from its surroundings must equal zero”.

$$\sum Q + \sum W = 0$$

6. Law of Conservation of energy:

The law of conservation of energy states that the total energy of an isolated system is constant; energy can be transformed from one form to another, but can be neither created nor destroyed.

7. Applied Thermodynamics:

“Applied thermodynamics is the science of the relationship between heat, work, and the properties of systems”

8. First Law of thermodynamics:

“The first law of thermodynamics is a version of the law of conservation of energy, adapted for thermodynamics processes, distinguishing two kinds of transfer of energy, as heat and as thermodynamic work, and relating them to a function of a body’s state, called internal energy.”