Transfer - Radiation, Convention and Conduction

Heat Transfer

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What is Heat Transfer?

According to thermodynamic systems, heat transfer is defined as

"The movement of heat across the border of the system due to a difference in temperature between the system and its surroundings."

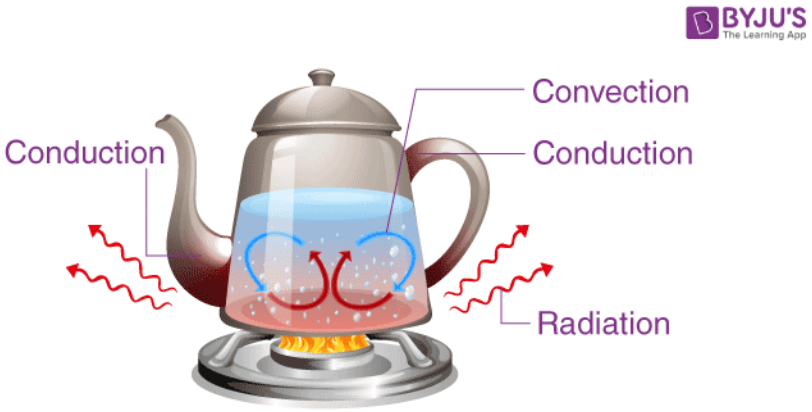
Interestingly, the difference in temperature is said to be a 'potential' that causes the transfer of heat from one point to another.

How is Heat Transferred?

Heat can travel from one place to another in several ways. The different modes of heat transfer include:

- Conduction
- Convection
- Radiation

Meanwhile, if the temperature difference exists between the two systems, heat will find a way to transfer from the higher to the lower system.



What is Conduction?

Conduction is defined as

The process of transmission of energy from one particle of the medium to another with the particles being in direct contact with each other.

An area of higher kinetic energy transfers thermal energy towards the lower kinetic energy area. High-speed particles clash with particles moving at a slow speed, as a result, slow speed particles increase their kinetic

energy. This is a typical form of heat transfer and takes place through physical contact. Conduction is also known as thermal conduction or heat conduction.

Following are the examples of conduction:

- Ironing of clothes is an example of conduction where the heat is conducted from the iron to the clothes.
- Heat is transferred from hands to ice cube resulting in the melting of an ice cube when held in hands.
- Heat conduction through the sand at the beaches. This can be experienced during summers. Sand is a good conductor of heat.

What is Convection?

Convection is defined as the movement of fluid molecules from higher temperature regions to lower temperature regions.

Convection Examples

Examples of convection include:

- Boiling of water, that is molecules that are denser move at the bottom while the molecules which are less dense move upwards resulting in the circular motion of the molecules so that water gets heated.
- Warm water around the equator moves towards the poles while cooler water at the poles moves towards the equator.
- Blood circulation in warm-blooded animals takes place with the help of convection, thereby regulating the body temperature.

What is Radiation?

Radiant heat is present in some or other form in our daily lives. Thermal radiations are referred to as radiant heat. Thermal radiation is generated by the emission of electromagnetic waves. These waves carry away the energy from the emitting body. Radiation takes place through a vacuum or transparent medium which can be either solid or liquid. Thermal radiation is the result of the random motion of molecules in matter. The movement of charged electrons and protons is responsible for the emission of electromagnetic radiation. Let us know more about radiation heat transfer.

Radiation heat transfer is measured by a device known as thermocouple. A thermocouple is used for measuring the temperature. In this device sometimes, error takes place while measuring the temperature through radiation heat transfer.

Radiation Example

Following are the examples of radiation:

- Microwave radiation emitted in the oven is an example of radiation.
- UV rays coming from the sun is an example of radiation.
- The release of alpha particles during the decaying of Uranium-238 into Thorium-234 is an example of radiation.