

PHYSICS (GRADE-6)

CH-1.2 Thermal Energy



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Define

- i) Specific heat capacity: The amount of thermal energy required to raise the temperature of 1 kg of a substance by 1 °C is called the specific heat capacity of the substance.
- ii) Conduction: The process of heat transfer in solids without the actual movement of particles is called conduction.
- iii) Thermal conductor: Solids through which heat travels quickly are called thermal conductors. For example, metals are good thermal conductors.
- iv) Convection: Convection is the main method of heat transmission in liquids and gases. Hot fluids rise and transfer thermal energy from one place to another due to the free movement of particles.
- v) Insulator: Materials that do not let heat flow through very well are called insulators. For example, plastic, foam, cloth, etc.
- vi) Radiation: Radiation is the process of heat transmission in vacuum by electromagnetic waves.
- v) Evaporation: The process of changing liquid water into water vapour before reaching its boiling point is called evaporation.

Q/A

1. What are differences between heat and temperature?

Ans.

The heat of an object is the total energy of all the molecular motions inside that object. It is measured in Joule (J).

Temperature is a measure of the average heat or thermal energy of the molecules in a substance. It indicates how hot something is. It is measured in degrees Celsius (°C).

2. Explain how heat is transferred by conduction.

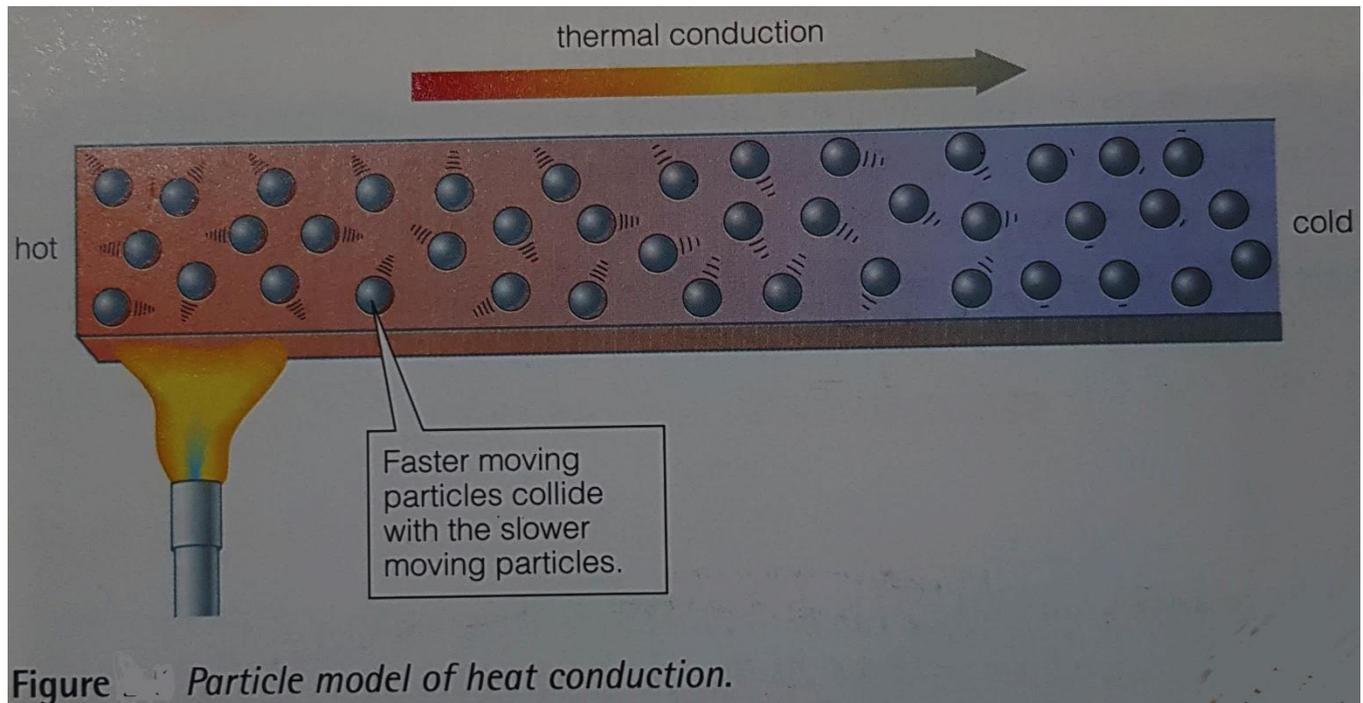
Ans.

Conduction is the mode of heat transmission in solids. Thermal energy travels from hot region to cold region.

When we hold an iron bar in fire, thermal energy travels along the bar to our hand. This is due to the heat transfer by conduction.

3. Draw and explain the molecular theory of conduction.

Ans.



When a solid material is heated, the molecules vibrate faster. When the molecules are vibrating, they collide with neighbouring molecules. This causes the neighbouring molecules to vibrate faster as well. Thus the thermal energy is passed along the chain of molecules from one end to the other end. This process is called thermal conduction.

4. Metals are good thermal conductors. Give reason.

Ans.

Metals are good thermal conductors because the energy is passed on by fast moving electrons. The electrons are free to move from place to place, and they quickly transfer their thermal energy to other electrons and atoms.

5. Explain the heat transmission by convection.

Ans.

Convection is the mode of heat transmission in liquids and gases. The particles in liquids and gases are free to move and flow from one region to another. When a liquid or gas is heated, it expands. It occupies larger volume, making it less dense. As the warmer air particles have lower density, they move upwards.

6. What is convection current and how is it useful?

Ans.

When air is heated, it expands. This makes it less dense than the colder air. The warmer air moves upwards, and the colder air flows in from the sides to replace it. This movement of air is known as convection current.

Convection current is useful for heating rooms. It is also responsible for cold draughts that can blow across the floor in poorly insulated houses. It also causes land breeze and sea breeze.

7. How does evaporation occur in liquids?

Ans.

Molecules in a liquid are close together and move around randomly. Some molecules will be moving faster than others. When fast moving molecules reach the surface, they escape from the liquid and form a vapour. Some of the molecules travel back into the liquid, but others escape completely. In this way the liquid slowly loses molecules to the surrounding and the liquid evaporates.