

Board – ICSE

Class – 8th

Topic – Heat Transfer

1. Give reasons for the following.

1. On supplying the same amount of heat to equal quantities of water and milk, their temperature rises by different amounts.
2. Water cannot be used as a thermometric liquid.
3. During summer, people use earthen pots to get cool water.

Answer:

1. On supplying the same amount of heat to equal quantities of water and milk, their temperature rises by different amounts. It is because the quantity of heat absorbed depends upon the nature of material.
 2. Water has the highest specific heat and a small amount of heat cannot raise the temperature of water. So water cannot be used as thermometric liquid
 3. When water comes out of the tiny pores of the earthen pots, it gets evaporated. It requires a lot of heat to change from liquid to vapour state. This heat is drawn from the surroundings and from the water itself. Thus water gets cooled. So people use earthen pots to get cool water during summer.
2. (a) Define heat energy.

(b) How does heat energy flow from one body to another body?

Answer:

- (a) Heat is an invisible energy which causes in us the sensation of hotness or coldness.
- (b) Heat energy always flows from a body at a higher temperature to a body at lower temperature till both the bodies attain same temperature.

3. State three factors which determine the quantity of heat energy in a body.

Answer:

The three factors which determine the quantity of heat energy in a body are:

- (a) Mass of the substance
- (b) Nature of the substance
- (c) Amount of heat supplied

4. Define the term specific heat capacity and state its units.

Answer:

The amount of heat energy required to raise the temperature of one gram of a substance through 1°C is called specific heat capacity of the substance.

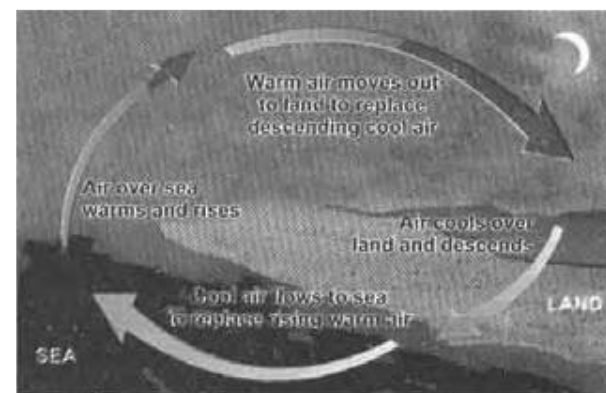
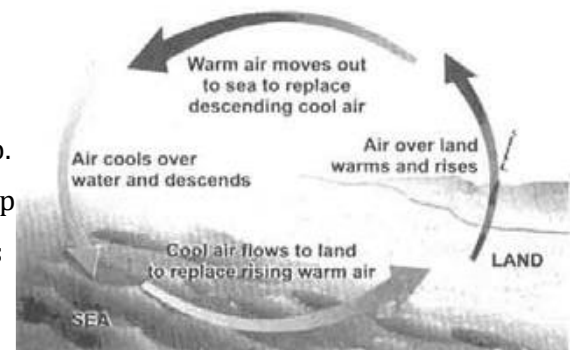
The S.I. unit of specific heat capacity is $\text{J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$. However, the unit $\text{J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ is commonly used.

5. Explain the formation of land and sea breezes.

Answer:

Sea Breeze: During day time, the temperature of the land rises more rapidly as compared to the sea. It is because the specific heat of land is less than the sea water. The air above the land gets heated, and rises up. It results in the fall of pressure on the land. To make up for this fall in pressure, the cold air from the sea starts blowing towards the land. It gives rise to sea breeze.

Land Breeze: During night, the land loses its heat more rapidly as compared to sea on account of its low specific heat capacity. So warm air above the sea expands and rises up. Thus, the air pressure falls over the sea. To make up for this fall in pressure, the cold air from the land starts blowing towards the sea giving rise to land breeze.



6. What do you understand by the term latent heat of vaporisation? Support your answer with an example.

Answer:

Latent heat of vaporization of a substance is the quantity of heat required to convert unit mass of a substance from liquid to vapour state at its boiling point without any change of temperature. For example, 1 g of water at 100°C requires 2260 J of energy to change into vapour at the same temperature.

7. Define the following terms.

1. Fusion
2. Solidification
3. Melting point
4. Freezing point
5. Vaporisation

Answer:

1. Fusion: The process due to which a solid changes into liquid state at some fixed temperature, by the absorption of heat energy is called fusion.
 2. Solidification: The process due to which a liquid changes into solid state at some fixed temperature by the liberation of heat energy is called solidification.
 3. Freezing point: The temperature at which a liquid starts changing into solid state is called freezing point.
 4. Melting point: The temperature at which a solid starts changing into liquid state is called melting point.
 5. Vaporisation : The process due to which a liquid rapidly changes into gaseous state at some fixed temperature due to absorption of heat energy is called vaporisation.
8. Explain how the human body maintains a constant temperature of about 98.4°F even when the outside temperature may be as 110°F.

Answer:

Evaporation helps in maintaining the body temperature at 98.4°F. When the atmospheric temperature rises, the body perspire. When the sweat evaporates, it takes the heat required from the body, thereby cooling it and maintaining the temperature of the body.

9. State three factors on which the evaporation of a liquid depends?

Answer:

Evaporation of a liquid depends upon the following three factors.

- (a) The nature of the liquid
- (b) Area of exposed surface
- (c) The temperature of the liquid
- (d) Humidity or the amount of water vapour present in air

10. What do you understand by the term latent heat of fusion? Support your answer with an example.

Answer:

The amount of heat energy supplied to a solid at its melting point, such that it changes into liquid state without any rise in temperature, is called latent heat of fusion.

For example, 1 kg of ice at 0°C requires 336000 J of energy to change into water at the same temperatures. This is known as latent heat of fusion of ice.

11. (a) Define (i) calorie (ii) kilocalorie.

(b) Name the unit in which heat energy is measured these days.

(c) How many joules are equal to one calorie?

Answer:

(a) (i) Calorie: The amount of heat energy required to raise the temperature of one gram of water through 1°C is called one calorie.

(ii) Kilocalorie: The amount of heat energy required to raise the temperature of 1 kilogram of water through 1°C is called one kilocalorie.

(b) These days, heat energy is measured in terms of Joules.

(c) 1 calorie = 4.2 joules

12. What do you understand by the term thermal capacity? State its units?

Answer:

The amount of heat energy required to raise the temperature of a given mass of substance through 1°C is called its heat capacity or thermal capacity. Its unit is $\text{J}/^{\circ}\text{C}$ in S.I. system.

13. Why is water used as a coolant in the radiators of motor car engines?

Answer:

Water is used as a coolant in the radiators of motor car engines as it has the highest specific heat capacity of $4.2 \text{ J/g } ^{\circ}\text{C}$. Thus it can absorb a large amount of excess heat energy produced by the automobile engines, but itself does not rise to a very high temperature.

14. What is evaporation?

Answer:

Evaporation is the process in which a liquid changes into its vapour, from its surface, at a temperature below its boiling point.

15. State three differences between evaporation and boiling.

Answer:

Evaporation	Boiling
1. It is a slow process.	1. It is a fast process.
2. It takes place at the surface of the liquid.	2. It takes place throughout the whole mass of the liquid.
3. It takes place at all temperature.	3. It takes place at a definite and constant temperature which is called boiling point of the liquid.