Questions

9.2 Why metals are good conductors of heat?

Metals are good conductors of heat because of the valence electrons freedom of motion within a metal. The free moving electrons transmit heat quickly.

9.3 Explains why?

a) A metal feels colder t touch than wood kept in a cold place?

b) Land breeze blows from land towards sea?

c) Double walled glass vessel is used in thermos flask?

d) Deserts soon get hot during the day and soon get cold after sunset?

Answers:

a) A metal feels colder t touch than wood kept in a cold place?

Metal is a thermal conductor and Wood is a thermal insulator. When you touch the metal the energy transfers rapidly to the metal, making it colder. When you touch the wood the energy transfers very slowly from your hand to the wood, this is why a metal feels colder t touch than wood kept in a cold place.

b) Land breeze blows from land towards sea?

In the night, land cools down much quicker than does the waters of the ocean. As the land becomes cooler, so does the air above it. This results in air becoming

denser forming a high pressure, causing winds to blow outward towards the sea this is known as land breeze.

Thus, in the day we often see sea breezes while in the evening VC land breezes in coastal regions.

c) Double walled glass vessel is used in thermos flask?

A vacuum flask consists of three vessels. One is the outer casing which simply holds the inner, double walled glass vessel which is brightly silvered, both inside and outside. This inside silver inning reflects heat back into the hot liquid inside (or prevents heat entering into a cold liquid). The outer wall is also silvered on both sides for the same reason.

Between the two walls which are sealed together at the top and bottom is a vacuum (a very low pressure) which has very few particles (molecules) through which leader conduction convection will easily takes place. (These forms of heat transfer need particles by which they will transfer the heat). However, radiated heat bill passes through a vacuum this is where the silver surface come into use.

d) Deserts soon get hot during the day and soon get cold after sunset?

In deserts sand has low specific heat that is why it will soon get heated or cold. Hence desert nights are colder whereas the days are very hot.

9.4 Why conduction of heat does not take place in gases?

Because the space between particles is father apart in either the gas or liquid state. Solid substances particles are very close together, whereas gas particles will actually move are far apart as possible. When the particles are farther apart it makes transfer of energy much less efficient. That is why conduction of heat does not take place in gases.

9.5 What measures do you suggest to conserve energy in houses?

a) Check your filters on your heating systems monthly remove clean or change when needed.

b) Make sure your balls on fully insulated this cut down on the amount of energy your home needs to keep it warm and cool.

c) Looks for cracks in your walls around your Windows and doors see them with weather stripping or caulking. Even the smallest whole will lose a great amount of energy overtime.

d) open your curtains and allow the sun to filter inside your home the sun can actually warm your house at night specially when it is called close your curtains to keep in your heat use insulated curtains

e) Only cool and heat rooms that actually need it.

f) Clean the back of your refrigerator where the coils are once in a week. Use a brush to remove the dust. Be sure to unplug your refrigerator while doing this.

g) Keep your refrigerator away from heated appliances such as dishwashers and heating ducts. If the refrigerator is near heat forces it will cause the refrigerator to work harder and thus run longer.

h) Save energy by washing your clothes in warm water instead of hot. You can also save energy by rinsing your clothes in the cold cycle you can even wash any clothes in cold water today by buying special detergents made for cold water.

i) Turn lights off when not in use.

j) If we all follow these steps on a regular basis, over time they will add up and save a huge amount of energy.

9.6 Why transfer of heat in fluids takes place by convention?

Conduction takes place in fluids (liquids or gases). As a fluid is heated, the molecules increase in motion and the flute begins to expand molecules move further apart. This gives a decrease in density which causes the hotter fluid to rise and cool the fluid to fall, setting up a circulation within the fluid. The heat energy is gradually increased throughout the fluid.

This method of heat transfer is seen in the use of space heating and in heat distribution in a furnace. Convection can take place by the natural currents set up by the application of heat it or increased heat transfer biomechanical means forced convection as when a fan for pump is used.

9.7 What is meant by convention current?

The flower that transfers heat with enough load is called a convection current. When you heat water, the molecules that are cold are heavy or dense, so they sink to the bottom. But the hot ones are less dense, so they go up as they go up, they get cold and also get heavy. So, they sink down and the cycle goes on and, on this process, will continue due to convection current.

9.8 Suggest a simple activity 2 sure connection of heat in gases not given in the book.

Convection is the circular moment of heat through a fluid such as air or water. The moment up guys because the utility causes the flood molecules to spread out with an excited state of energy.

This surprising out cause of targeted forward to become less dense then the surrounding fluid, so it rises. As the energy dissipates its gains density and again starts to settle back down.

Activity:

So, in your example, the flame at the bottom of the oven heats the surrounding air which circulates inside the oven and transfers energy to the food. Once the heat hits the food, the inside of it gets cooked by conduction.

9.9 How does heat reach us from the sun?

Sunlight or solid radiation is essentially photons or packet of energy emitted from the sun's surface which are able to travel through the vacuum of space at the speed of light by the process of radiation. This comes to us in a range of wavelengths, including Visible light, Ultraviolet and Infra-red radiation.

9.10 How various surfaces can be compared by a Leslie cube?

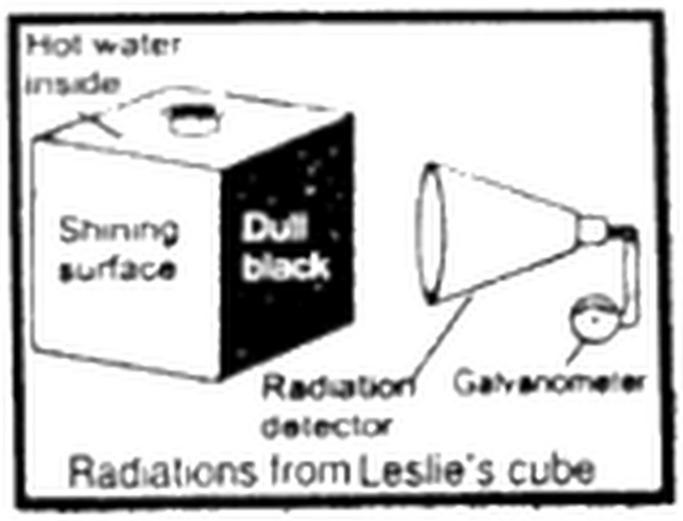
The rate at which various surfaces emit heat depends upon the nature of the surface. These surfaces can be compared using Leslie's cube.

Emission and absorption of radiation:

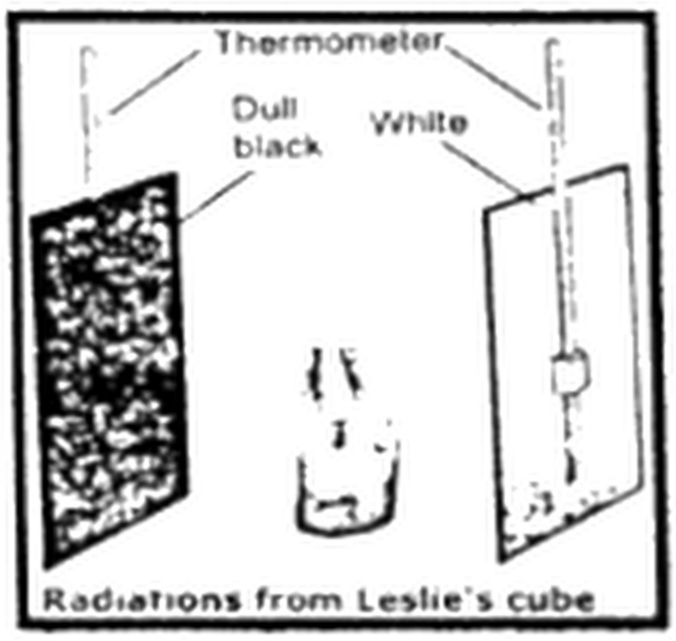
A Leslie cube is a metal box having faces of different nature. The four faces of Leslie's cube may be as follows:

- A shiny silvered surface
- A dull black surface
- A white surface
- A colored surface

Hot water is filled in the Leslie's cube and in placed with one of its face towards a radiation detector. It is found that black dull surface is a good emitter of heat.



Radiations from Leslie's cube



Radiations from Leslie's cube

The rate at which various surfaces absorb heat also depends upon the nature of those surfaces. For example, take two surfaces, one is dull black and the other is a silver polished surface as shown in figure with a candle at the middle of the surface. It is found that:

1. A dull black surface is good absorber of heat as its temperature rises rapidly.
2. A polished surface is a poor absorber of heat as its temperature rises very slowly. The observations made from the set up are shown in the table given below:

Surfaces	Emitter	Absorber	Reflector
Dull black surface	best	best	worst
Colored Surface	good	good	bad
White Surface	bad	bad	good
Shining silvered surface	worst	worst	best

It is also found that the transfer off heat by radiation is also affected by the surface area of the body emitting or absorbing heat. Larger is the area, greater

will be the transfer of heat. It is due to the reason of large numbers of slots are made in radiations to increase their surface area.

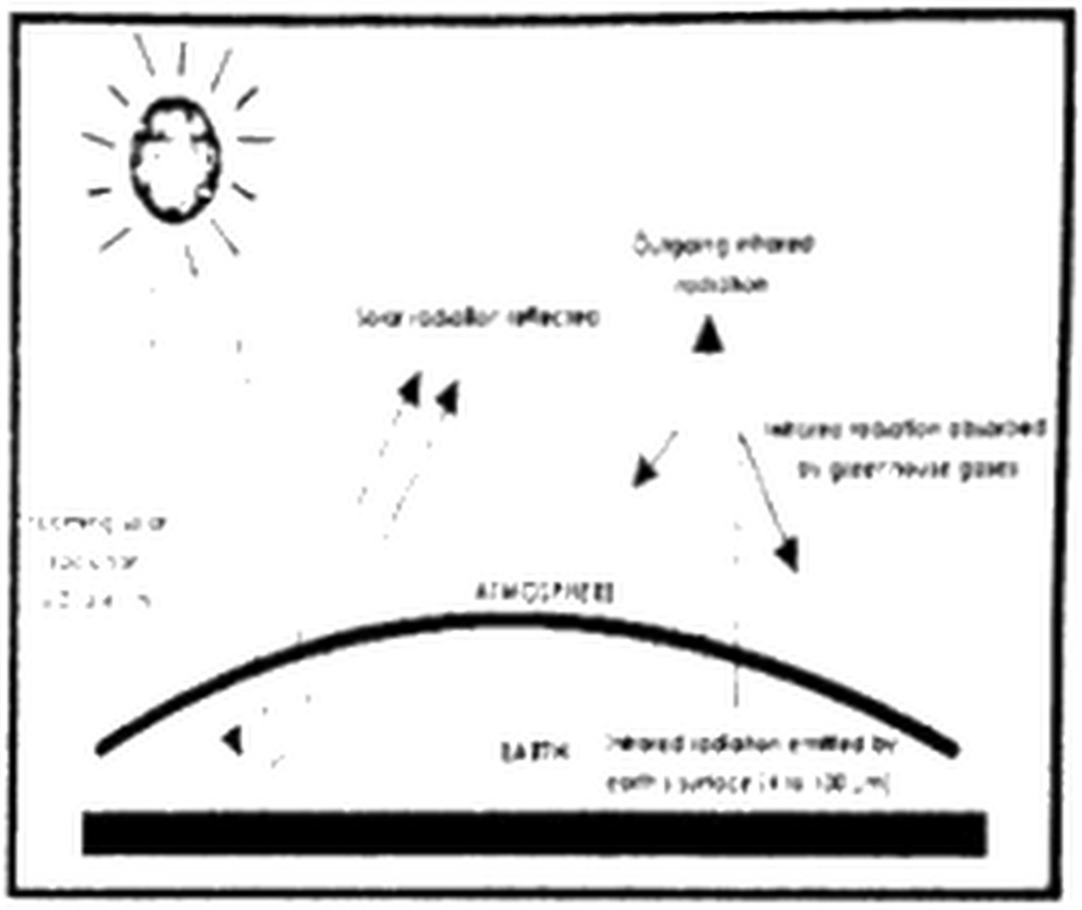
9.11 What is greenhouse effect?

Greenhouse effect:

Warming that result when solar radiation is trapped by the atmosphere, caused by atmospheric gases that allow sunshine to pass through but absorb heat that is radiated back from the warmed surface of the earth.

Explanation:

Light from the Sun contains thermal radiations of long wavelengths as well as light and ultraviolet radiations of short wavelengths. Glass and transparent polythene sheets allow radiations of short wavelength to pass through easily but not long wavelengths of thermal radiations. Thus, a greenhouse becomes a heat trap.



Radiations from the Sun pass easily through glass and warms up the objects in a greenhouse. These objects and plants give out radiations of much longer

wavelengths. Glass and transparent polythene sheets do not allow then to escape out easily and are reflected back in the greenhouse. Thus, maintains the inside temperature of the greenhouse. Greenhouse effect promises better growth of some plants.

9.12 Explain the impact of greenhouse in global warning.

Global warming:

Carbon dioxide and water also behave in a similar way to radiations as glass or polythene Earth's atmosphere contains carbon dioxide and water vapors. It causes greenhouse effect and thus maintains the temperature of the Earth.

During the recent years, the percentage of carbon dioxide has been increased considerably. This has caused an increase in the average temperature of the Earth by trapping more heat due to greenhouse effect. This phenomenon is known as global warming. It has serious implications for the global climate.