Question:1

Write the advantages of an alcohol thermometer over a mercury thermometer.

Solution:

Following are the advantages of alcohol thermometer:

1. They are cheaper and less harmful than mercury thermometers.
2. They can measure temperatures down to -115°C, which is much lower than mercury thermometers.

Question:2

How does conduction occur?

Solution:

Conduction is the primary mode of heat transfer in solid materials. When a solid is heated, the vibrations of the particles at the heated end are increased. These particles collide with each other while vibrating and transfer the heat to the slow moving neighbouring particles. They in turn begin to vibrate faster and transfer heat to their neighbours. Thus, although the particles remain in their own place, heat is transferred by the vibrating particles through conduction

Question:3

Write one word for the following.

1. An instrument used to measure temperature .....
2. The primary mode of heat transfer inside a metal object .....
3. The primary mode of heat transfer in gases .....
4. The mode of heat transfer form the sun to the Earth .....

Solution:

1. Thermometer
2. Conduction
3. Convection
4. Radiation

Question:4

Define the following $with respect to heat energy$

1. Temperature
2. Heat Energy
3. Conduction
4. Conductors
5. Insulators
6. Convection
7. Radiation

Solution:

1. Temperature is the degree of hotness or coldness of a place or a body.
2. Heat Energy is the form of energy, which flows from a hot body to cold body.
3. Conduction is the mode of heat transfer when two bodies come in contact and is primary mode of heat transfer in solids.
4. Conductors are substances that can easily conduct heat energy.
5. Insulators are substances that do not conduct heat energy very well.
6. Convection is a mode of heat transfer occurring due to mass movement of a liquid or a gas itself.
7. Radiation is a mode of transfer of heat energy in the form of electromagnetic waves.

Question:5

Temperature is measured in

a calories
b Celsius
c Joule
d All of these

Solution:

b Celsius.
Temperature is measured in Celsius and Fahrenheit.

Question:6

The SI unit of heat is

a Celsius
b calorie
c energy

d joule

Solution:

d Joule.

Heat is a form of energy and its SI unit is Joule.

Question:7

Heat energy will flow from body 'A' to body 'B' if

a B is at a higher temperature than A

b A is at a higher temperature than B

c both are at the same temperature

d both are very hot

Solution:

b A is at a higher temperature than B.

Heat energy flows from a body with higher temperature to another body with lower temperature.

Question:8

The primary mode of heat transfer in liquid is

a conduction

b liquid does not transfer heat

c radiation

d convection

Solution:

d Convection.

Convection is the primary mode of heat transfer in fluids.

Question:9

In a thermos flask, there is a minimization of heat loss due to

a conduction

b convection

c radiation

d all of these

Solution:

d All of these.

In a thermos flask, heat loss is minimized by all three modes of heat transfer, conduction,

convection and radiation.

Question:10

Name any two temperature scales that are commonly used.

Solution:

The two temperature scales commonly used are the Celsius and the Fahrenheit scales.

Question:11

Write two characteristic features of an alcohol thermometer.

Solution:

The two features of an alcohol thermometer are that they are cheaper and less harmful.

Question:12

What is the purpose of the king in a mercury clinical thermometer?

Solution:

The kink in the mercury clinical thermometer is made to prevent the mercury in the thermometer from contracting and flowing back to the bulb before the temperature is read.

Question:13

What are the precautions that one must follow while handling thermometers?

Solution:

Following precautions must be followed while handling the thermometers:

1. Wash the thermometer and dip it into an antiseptic liquid before and after use.
2. Additional care must be taken as the thermometer can easily break and the mercury inside, is a toxic substance.
3. Make sure that you do not touch the bulb of the thermometer either before measuring the temperature or during measurement to avoid getting a wrong reading.

Question:14

Name any two units used for measuring heat energy.

Solution:

The two units of measuring heat energy are calories and joules.

Question:15

What are the three modes of heat transfer?

Solution:

The three modes of heat transfer are conduction, convection and radiation.

Question:16

Give reasons for the following:

a When we want to warm a liquid, we should warm it from below.

b Places close to the sea have a moderate temperature.

Solution:

a) When we heat water from below, water at the bottom of the vessel becomes hot and rises up as it is lighter than cold water. It carries heat energy along with it, thus heating all the water in the vessel.

b) Land heats up faster during the day causing sea breeze and when the lands cool down faster at night, it causes land breeze. Thus, convection helps to maintain moderate temperature at places near the sea.

Question:17

On a cold winter day, the temperature was 23 °F. What would this temperature be in degree celsius?

Solution:

We know

$$\mathrm{C} = \frac{5}{9}\left(\mathrm{F} - 32\right) = \frac{5}{9}\left(23 - 32\right) = -5$$

Therefore, the day temperature of 23°F would be -5°C.

Question:18

On the top of a mountain, water boils at 95°C. Express this temperature on the Fahrenheit scale.

Solution:

We know that

$$\mathrm{F} = \left(\mathrm{C} \times \frac{9}{5}\right) + 32 = \left(95 \times \frac{9}{5}\right) + 32 = 203$$

Therefore, water boils at 203°F on top of the mountain.

Question:19

What is the difference between conduction and convection? Name one medium in each case where it is the primary mode of heat transfer.

Solution:

Conduction	Convection
Heat transfer occurs due to collision of vibrating particles.	Heat transfer occurs due to mass movement of the liquid or gas itself.
Particles do not move from their original place.	Particles move from their place and transfer heat.
Primary mode of heat transfer in solids.	Primary mode of heat transfer in liquids and gases

Question:20

Differentiate between conductors and insulators.

Solution:

Conductors	Insulators
Substances that conduct heat easily.	Substances that do not conduct heat very well.
Some examples are metals.	Some examples are wood, clay, wool.
Good conductors are used to make cooking utensils.	Insulators materials are used to make special jackets for fire fighters and racing car drivers.

Question:21

What kind of clothes should we wear in summer and winter? Why?

Solution:

During summer we should wear white and light coloured clothes, while in winter we should wear dark clothes. Black bodies absorb radiated heat more than white bodies. As we need to absorb more heat to keep warm during winter, dark clothes make us feel comfortable. White clothes absorb comparatively less amount of heat than dark clothes and help to keep us cooler, so we prefer them in summer.