IV. Answer in brief:

1. Ice is kept in a double - walled container. Why?

An ice-box is made of double wall and the space between the walls is filled with some non-conducting materials to provide heat insulation, causing minimal loss of heat. Hence ice is kept in a double - walled container.

2. How does the water kept in an earthen pot remain cool?

As the water seeps out of the earthen pot, it gets evaporated and takes away heat from the pot causing the water in the pot cool.

3. Differentiate between convection and radiation?

Convection	Radiation
* The process of transfer of heat in which the molecules of fluids move themselves to carry heat from hot end to cold end.	* The process of transfer of heat is directly transferred from the hot body to cold body.
* Convection needs matter to be present	* Radiation does not need matter, it occurs even in vacuum
Eg: Land and Sea breeze	* Eg: Transfer of heat energy from the sun

4. Why do people prefer wearing white clothes during summer?

White clothes absorb the least amount of heat energy from the sun and hence keeps us comfortable during summer.

V. Answer in detail:

5. How can you experimentally prove water is a bad conductor of heat? How is it possible to heat water easily while cooking?

a) Half fill a test tube with cold water. Wrap a piece of ice in wire gauze and drop it in the tube.

Observation:

i) It will sink to the bottom

ii) Now heat the top end of the test tube.

iii) The water soon begins to boil at the top but the ice below has still not fully melted.

Heat required in calories

1 calorie = 4.18J

10450 J = 2500 calories.

2. What could be the final temperature of a mixture of 100g of water at 90°C and 600g of water at 20°C?

Given:

Mass of water m_1=100g=0.1kg

Specific heat capacity of water = 4200 $Jkg^{-1}k^{-1}$

Temperature = 90°C

Mass of water m_2 = 600g=0.6kg

Temperature = 20°C

Solution:

Heat lost by hot water = Heat gained by cold water

$m_1 \times C \times \theta_1 = m_2 \times C \times \theta_2$

$0.1 \times 4200 \times (90-T_F) = 0.6 \times 4200 \times (T_F-20)$

$0.1 \times (90-T_F) = (T_F-20) \times 0.6$

$9-0.1\ T_F = 0.6\ T_F-12$

$-0.1\ T_F-0.6\ T_F = -12-9$

$-0.7\ T_F = -21$

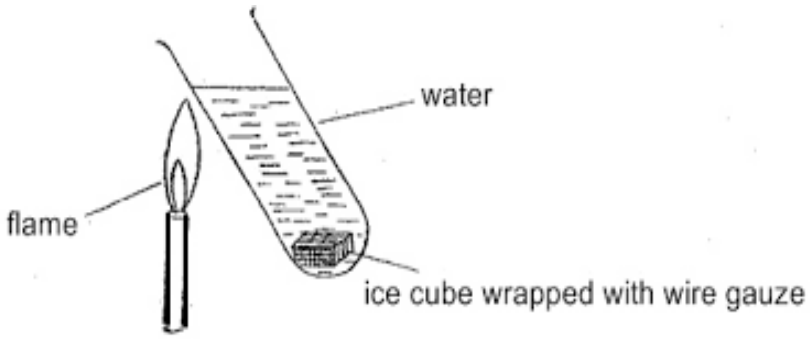
$T_F = \frac{21}{0.7}$

$T_F = 30℃$

Final temperature of the mixture = 30℃

3. How much heat energy is required to change 2kg of ice at 0℃ into water at 20℃? (specific latent heat of fusion of water =3,34,000 J/Kg).

This activity shows that water is a bad conductor of heat. It does not easily conduct heat from the top to the bottom of the test tube.



VI. Numerical Problems:

1. What is the heat in joules required to raise the temperature of 25 grams of water from 0℃ to 100℃? What is the heat in calories? (Specific heat of water =4.18 J/g℃).

Given: Mass of water m=25g

Initial Temperature $T_1 = 0℃$

Final temperature $T_2 = 100℃$

$\Delta T = T_2-T_1$

$= (100-0)℃$

$\Delta T = 100℃$

Specific heat of water C=4.18 $J/g^{℃}$

Solution:

Heat required Q=m×C× ΔT

Q=25×4.18×100

Q=10450J

Heat capacity of water = 4200 $Jkg^{-1}k^{-1}$

Given:

Mass of ice m=2kg

Specific latent heat of fusion of water =L=3,34,000 J/Kg

Change in temperature $\Delta T=(T_2-T_1)$

$= (20-0)^{℃}$

$\Delta T = 20℃$

Specific heat capacity of water

$C=4200\ Jkg^{-1}K^{-1}$

Heat Energy required = m×C×ΔT+m×L

=2× 4200×20+2×3,34,000

=1,68,000+6,68,000

Heat Energy required =8,36,000J