12. What is the change in average kinetic energy of molecules of a liquid during boiling at its boiling point?

Ans: Average kinetic energy is the measure of the temperature of a body. When the temperature of the body increases, the average kinetic energy increases and when the average kinetic energy decreases, there is a decrease in the body temperature and hence at the boiling point, the average kinetic energy increases.

15. What do you understand by the thermal expansion of ~~solids~~ a substance?

Ans: The expansion of a substance on heating is called the thermal expansion of a the substance.

18. State three factors on which depends the linear expansion of a metal rod on heating?

Ans: The factors on which the linear expansion of a metal rod on heating depends are:

(i) The length of the rod L: Increase in length is directly proportional to its original length.

(ii) The temperature of the rod. It is directly proportional to the increase in temperatures.

(iii) The Nature of the material of the rod.

If L is the original length of the rod at t_1 C and on heating it to $t_2°C$, its length becomes L_2.

∴ The increase in the length of the rod = $(L_2 - L_1)$ and

∵ the increase in temperature = $(t_2 - t_1)$

∴ $[L_2 - L_1] \propto L_1 (t_2 - t_1)$

But the increase in the length of the rod does not depend on whether the rod is solid or hollow.

19. Two iron rods — one 10 m long and one 5 m long are heated to the same rise in temperature. Which will expand more?

Ans: $L_2 - L_1 \propto L_1$

The rod having the greater length will expand more when compared to the other when given the same rise in the temperatures

∴ The rod having 10 cm as its length will expand more.

24. Explain the following:

(a) The telephone wires break in winter.

(b) The iron rims are heated before they are fixed on the wooden wheels.

(c) Gaps are left between the successive rails on a railway track.

(d) A glass stopper stuck in the neck of a bottle can be removed by pouring hot water on the neck of the bottle.

(e) A cement floor is laid in small pieces with gaps in between.

Ans: (a) Metals expand on heating (in summer) and contract on cooling (in winter). Therefore while putting up the wires between two poles, care is taken that they are kept tight while laying ~~laying~~ them in winter as they sag in summer due to expansion.

(b) Iron rims are made slightly smaller in diameter than ^ the wooden wheel and on heating, the wheel expands and can easily slip over the wooden wheel and of cooling the rim contracts and makes a tight √ fit over the wooden wheel.

27. A cubical metal solid block is heated. How will its volume change?

Ans: When a solid is heated, it expands in all directions. The volume of the cube also increases.

Let V_0 be the volume of the cube of the side L, at $0°C$. i.e. $V_0 = L^3_0 - V_0$. When ⑥ the temperature increases to $t°C$ each side increases to V_t.

$$\therefore V_t = L^3_t$$

Increase in volume $= (V_t - V_0)$
$[L^3_t - L^3_0]$
Increase in temperature $= (t - 0)°C$
$= t°C$.

32. Which of the following will expand more? when heated at the same temperature? (a) solid (b) liquid (c) gas?

Ans: Gas will expand more as the inter-molecular force in the gas molecules is the least and the kinetic energy is the maximum.